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NOTES ET COMMENTAIRES

La Revue Agricole souhaite la bienvenue à M. J. Bett, Land Settlement Officer, qui a pris ses fonctions dans la colonie depuis environ un mois.

Nous offrons nos félicitations à Monsieur André Martin qui a été élu membre associé de l'Institution of Mechanical Engineers (A.I. Mech. E.).

Les conditions météorologiques qui prévalurent pendant la première partie de l'été ont été en général défavorables à la croissance de la canne, et il ne serait pas étonnant que la coupe de 1947 soit au dessous de la normale. M. Aimé de Sornay nous communique une brève analyse des relevés météorologiques de novembre 1946 à mars 1947, qui nous en sommes sûr, intéressera les lecteurs de la Revue Agricole.

" En novembre 1946 la température fut au dessus de la normale et la pluie très abondante et bien distribuée. De telles conditions assurèrent un excellent départ à la coupe 1946-47. En décembre la température resta élevée mais, par contre, la pluie fit défaut. Pendant la période janvier-mars 1947, la pluviosité demeura au desssous de la moyenne, malgré le passage de plusieurs cyclones éloignés dont un d'intensité modérée. La température fut bien au dessus de la normale en janvier et à peu près normale en février. En mars, le manque de pluie s'accentua davantage : les précipitations montrèrent des écarts négatifs considérables se chiffrant, en moyenne, à plus de 60% , le déficit se faisant particulièrement sentir dans le Nord et l'Ouest. La température au Réduit fut de 0.8 °C plus basse que la moyenne. Les conditions de croissance furent, en conséquence, très mauvaises durant ce mois. "

Dans la livraison de novembre 1946 du périodique " Food Manufacture ", le professeur P. E. Verkade parle du composé 1 - *n* - propoxy - 2 - amino - 4 - nitrobenzene découvert par le chimiste Hollandais P. W. H. van der Weyden. Cette substance qui a été isolée sous la forme d'une huile rouge a la propriété de sucrer 3300 fois plus que le saccharose. Le principe sucrant de ce composé a été isolé plus tard sous la forme de cristaux orange qui sucrent 4100 fois plus que le saccharose et 8 fois plus que la saccharine. L'on a commencé la manufacture de ces cristaux en Hollande et aux Etats-Unis pour sucrer les conserves et bonbons.

Pendant 5 ans on a retiré des avions faisant escale à Honolulu aux îles Hawaï, 10081 insectes, dont 2067 vivants. Certaines de ces espèces n'existent pas aux îles Hawaï et sont nuisibles aux cultures.

RESULTS OF SOME PRELIMINARY INVESTIGATIONS ON THE CONTROL OF WEEDS IN MAURITIUS

DR. H. EVANS
Botanist, Sugarcane Research Station, Mauritius.

Part VII — Data on some additional noxious weeds.

Wikstroemia indica (Herbe Tourterelle).

This shrubby weed used to be one of the dominant species in the secondary vegetation of Mauritius being an intermediate stage in the succession from grassland to forest. It has to a large extent been ousted from this position by Herbe Condé (*Cordia macrostachya*) but still attains localized importance as a weed of pasturages, and is frequently found in association with Condé as a subordinate species.

Experiments on the control of this weed with M.C.P.A. and a certain number with D.C.P.A. have been carried out at intervals over the last nine months in order to test the reaction of the plant to the herbicides employed under different climatic conditions. Concentrations of M.C.P.A. from 0.1 to 1.0% have been used and concentrations of D.C.P.A. of 0.2 and 0.4%.

The leaves of Herbe Tourterelle quickly turn yellow and drop off when treated with M.C.P.A. or D.C.P.A. but die back of the stem is restricted to the tender growing shoots. There is very little increase in efficacy of the herbicides when the concentration is increased from 0.2% to as much as 1 o/o. Regrowth soon commences from the main stems and no abnormalities in the nature of the new leaves have been recorded.

In fact, Herbe Tourterelle is considerably more resistant to the hormone weed killers than Herbe Condé.

The leaves of Herbe Tourterelle are killed by applications of any of the D.N.O.C. compounds, sodium chlorate and copper chloride. So far as leaf damage is concerned, copper chloride is the most toxic. None of these compounds, however, kill the weed when applied once only.

After considerable experimentation it has been found that the most efficient method of killing this weed is to cut it at, or slightly above, ground level and to apply, with a mop or other device, a saturated solution of sodium chlorate to the cut surface. Providing that this operation is done on a warm dry day the chlorate is translocated downwards and completely kills the root-stock. The rapid downward transport was confirmed by the used of a red dye. The dye penetrated about 20 cms or more down into the rootstock and roots in a few hours. It will be recalled

that a similar technique was tried with Herbe Condé and was not successful in killing the latter weed. This was explained by the fact that the red dye only penetrate 2 or 3 cms. downwards in Herbe Condé and confirmed that the chlorate was not freely translocated to the root stock, from which in fact, new shoots arose later.

A method of applying this chlorate method for the control of the Bracken fern in England was described by Bates (1940).

The principle of this method is that the cutting and the smearing of a saturated chlorate solution to the cut surface is done in one operation. It has been applied both to the scythe and to the usual reciprocating knife-bar machine used in the temperate regions for cutting hay and cereals. A reservoir and a flexible tube feeds the solution into a sponge-rubber pad attached to the cutting blade and placed slightly below it so that the cut stump of the plant is smeared with the solution.

There seems to be no obstacle to the attachement of such a pad to a sickle which would be a useful instrument for the cutting of such plants as Herbe Touterelle. The advantage of such a method is in the small quantities of chlorate required. Thus, in the case of bracken, Bates found that whereas it required 100 Kilos per acre of chlorate to kill the weed by spraying, 15-20 lb per acre was effective when the chlorate was introduced directly into the plant by the method described above.

In the absence of a suitable instrument to cut and apply the chlorate in one operation, there is no reason why the cutting and smearing should not be done in two operations. The smearing in this case could easily be effected with a mop type of pad. It would be an advantage to add a red dye to the chlorate solution so that the operator can ensure that the application is being satisfactorily performed.

Lantana camara (Vieille fille).

This well-known shrub attains importance as a weed in certain restricted localities : it was of considerably greater importance before the advent of Herbe Condé but the latter has ousted it to a considerable degree from the habitats wherein it flourished. Its spread has caused some concern in the island of Rodrigues and a campaign for its eradication is now in hand in that island.

Lantana reacts to the D.N.O.C. weed killers and sodium chlorate in much the same manner as Herbe Condé, the leaves and tender shoots being killed and regrowth soon commences from the lower regions of the stem, and eradication by this means would be uneconomic.

Experiments with M.C.P.A. were initiated in June 1946 and have been carried out at intervals since that date.

As is well-known there are two forms of *Lantana* in Mauritius : the one variety with flowers which are preponderantly yellowish to orange in colour, the other with flowers which are mainly pink.

There proved to be a marked difference in the susceptibility of these two forms when treated with the same dosage of M.C.P.A. — the pink form reacted rapidly and the plants were killed outright within a month, the orange-flowered variety reacted more slowly and although shoots were killed back for a considerable distance the plant was not killed and later recovered and produced more flowers and fruits.

These experiments were repeated on a larger scale and the results of the preliminary trials were confirmed,

Small plants of the pink-flowered form were killed completely by applications of 0.15-0.25 o/o M.C.P.A. but similar plants of the orange-flowered type required 0.5% - 0.75% M.C.P.A.

Further experiments on large plants with main stems 1½"-4" diameter showed that such plants could not be killed by one application but the difference in susceptibility of the pink and orange-flowered forms was maintained. With the pink-flowered form the shrubs were killed back until only a foot or so of the main stem remained viable when sprayed with 0.25% M.C.P.A. This portion produced new shoots but when these were subsequently sprayed the plants were completely killed. Higher concentrations of hormone did not result in a killing of the plant in one application.

In the case of large orange-flowered bushes the die-back following the first application was not so extensive and regrowth was fairly considerable. However, a second application killed back the shoots almost to soil level but in some cases a third application was necessary completely to eradicate the plants.

Treatment of *Lantana* by M.C.P.A. or D.C.P.A. is considerably more effective than by sodium chlorate. The chlorate results in a die-back of the shoots for a considerable distance but new growth soon commences from the main stem. Repeated spraying with chlorate will eventually kill the plant but the treatment is less efficient than spraying with a hormone herbicide.

Attempts were made to kill large plants by cutting the main stem at ground level and applying (a) 10% M.C.P.A., (b) 10% D.C.P.A. and (c) a saturated solution of Sodium chlorate to the cut stump. In all cases the herbicides only travel downwards for a few centimetres and new shoots soon emerged. The chlorate delayed the formation of new shoots for a longer period than the M.C.P.A. and D.C.P.A.

A considerable saving in the amounts of M.C.P.A. and D.C.P.A. required to kill large plants is effected by first cutting the plants at, or near ground level and delaying the spraying operation until actively growing shoots are produced from the stumps.

Whether or not such preliminary treatment is feasible depends on the availability and cost of labour.

In either case the most economic treatment is likely to be repeated spraying with 0.15% M.C.P.A. or D.C.P.A. Pink-flowered forms will

require 1-2 applications depending upon the size of the plant while large orange-flowered bushes will require a minimum of 2 applications and large plants may require 3 applications.

Acacia concinna (Sappan, Chickakai)

This shrubby member of the Leguminosae is a particular nuisance in the drier regions of the island particularly in the lower Plaines Wilhems and Black River districts. It is difficult to eradicate and the work is considerably enhanced by the presence of abundant prickles.

It is relatively resistant to the phenoxyacetic acid herbicides, the leaves soon become yellow and die as a result of spraying with these substances but the stem is but little affected and new growth is produced from the stem soon afterwards.

Its susceptibility to sodium chlorate was established at Réduit in the course of experiments on the control of Herbe Condé.

Several large plants occuring in Condé plots treated with 20 o/o sodium chlorate at 100 gallons per arpent were killed outright.

Further experiments were made with varying concentrations of chlorate and it was shown that the critical concentation was in the region of 10 o/o. Spraying with 5 o/o concentration although causing severe damage did not kill the plants whereas 10 o/o was effective.

The method was put to further test in a large experiment at Richelieu. In this case a copse of Sappan plants had sent rhizomes into a cultivated field and a considerable area of the latter was infested with Sappan bushes up to 3 feet in height.

Some of the large bushes in the copse and all the small bushes in the field were sprayed with 10 o/o chlorate.

Several of the large bushes were killed outright by the single application. Of the bushes in the field, about 40 o/o were killed outright. The remainder were killed to the soil surface but some small chlorotic shoots had emerged from the root stock. These were killed by a second much reduced spraying operation.

It may, therefore, be concluded that individual bushes of this weed are killed by one application of 10 o/o chlorate but when a field is infested with underground runners or rhizomes several metres long, a watch will have to be kept for new shoots which may arise from these rhizomes and these killed off as soon as they appear. Only small quantities of chlorate are required after the main bushes have been destroyed, one or two gallons of spraying liquid can deal with a large number of such secondary shoots.

There is no doubt that spraying with 10% chlorate is the most effective method of dealing with this weed.

Alocasia macrorhyza (Songe blanc or Songe sauvage)

This weed attains the status of a bad weed in the high rainfall districts and along irrigation canals in the lower rainfall areas. It has thick fleshy rhizomes which pass downwards from the tuberous root stock, often to considerable depths. Experiments on the control of this weed were mainly carried out at Alma S.E., Rose Belle S.E. and Highlands S.E.

The leaves of Songe are wetted with considerable difficulty and spraying of the plants with D.N.O.C. compounds, including activated proprietary D.N.O.C. herbicides gave very poor results even with the addition of liberal quantities of wetting agents. When plants were drenched with 2-3 times the usual concentration of D.N.O.C. compounds (i.e. 2-3 o/o concentration) scorching of the leaves resulted but new leaves were formed almost immediately. New leaves are formed with considerable rapidity after treatment with sodium chlorate also. Plots of large plants at Valona were treated with 0.15 o/o and 0.25 o/o M.C.P.A. The effect on the leaves is striking, the petioles undergoing violent curvatures finally depositing the laminæ of the leaves on the surface of the ground. All these leaves rotted but after about one month small leaves emerged from the crown of the plant.

Similar results were obtained in the experiments at Highlands S.E. where Songe was treated with 0.1 o/o, 0.2 o/o and 0.3 o/o M.C.P.A.

The grow rate of these new leaves was very low and three months afterwards the leaves were still markedly subnormal in size.

They were given a second spraying at this time. Following this second application emergence of new leaves was considerably delayed although a few dwarf leaves subsequently emerged.

No D.C.P.A. has been available for investigation on this weed.

It may be concluded that M.C.P.A. gives such an excellent depressing effect on Songe with two applications of 0.2 o/o that it may, for agricultural purposes, be regarded as amounting to economic control.

Mimosa pudica (Sensitive)

This well-known member of the Leguminosæ attains the status of a nuisance weed in restricted localities in the dry and intermediate rainfall districts. Experiments on the control of this weed using M.C.P.A., D.C.P.A. and the D.N.O.C. compounds were made at Deux Bras (Mon Désert & Mon Trésor S.E.), M.C.P.A. only at Olivia (Beau Champ S.E.) and using Sodium chlorate at various concentrations at Richelieu.

At Deux Bras plots treated with 250 Kilos Agroxone, 0.2% M.C.P.A. and 0.5 o/o D.C.P.A. in the form of Chloroxone were almost unaffected.

The proprietary D.N.O.C. compounds "Denoc" at 225 grams per gallon and "Denocate" at 270 grams per gallon caused a localized scorching effect on the leaves but the plants quickly recovered.

At Olivia M.C.P.A. at 1.5% (15 lbs. per arpent) caused the death of almost all the leaves, but the stems were unaffected and soon commenced producing new shoots.

It was apparent from these results that economic control of this weed was not likely to be achieved by M.C.P.A., D.C.P.A. nor by the D.N.O.C. compounds. Further experiments were made at Richelieu Tobacco Research Station where plots of the weed growing alongside an irrigation canal and forming a dense shrubby vegetation two feet or more in height were sprayed with 5 o/o, 10 o/o and 15 o/o sodium chlorate with addition of Teepol wetter. All strengths of chlorate killed the plants to within one inch or two of the soil level. One month after the treatment was applied a few small chlorotic shoots were emerging from this basal undamaged part of the plant. On this date the plots were fired, the complete drying and shrivelling of all aerial parts caused by the chlorate applications made this easy. The thickness of the vegetation made it difficult for the chlorate to penetrate to the base of the plant but following the removal of this vegetation by burning following chlorate treatment, a second application directly made on any new shoots mhich may arise is highly effective. The 5 o/o chlorate solution gave equally good results as when higher concentrations were used, but regrowth after the first application was somewhat greater than that occuring in the higher concentrations.

This is the only chemical method for destroying this weed at present available. Among other species of plants which occured in the plots at Richelieu and which were completely killed by chlorate spraying were *Convolvulus* sp., *Bidens pilosa* (Ville Bague), *Corchorus capsularis*, *Tridax procumbens* (Herbe Caille), *Rhynchelytrum repens* (Natal Red top grass), *Mikania scandens* (Liane Margoze), *Vicia saliva* (Lentille sauvage) and *Acacia* sp.

Tridax procumbens (Herbe Caille)

This perennial Composite is listed as a bed weed particularly in the Rivière du Rempart district and to a lesser extent in the Pamplemousses, Savanne and Black River districts. Experiments on its control were made at Richelieu where the weed occured in almost pure stand.

Plots were treated with 0.1, 0.2 and 0.3 o/o M.C.P.A. as a liquid spray and with 100 Kilos per arpent agroxone (containing 1 o/o M.C.P.A.).

Control of the weed with M.C.P.A. was highly satisfactory. Over 60 o/o of the plants were killed in the 0.1 o/o M.C.P.A. and 100 kilos agroxone plots and there was practically complete control in the 0.2 o/o and 0.3 o/o plots.

In the two latter plots Tricorne (*Acanthospermum hispidum*) was present in large numbers. This was completely killed by the M.C.P.A. treatments. Tricorne has been reported as being a weed which is encroaching on pasturages in the island of Rodrigues. It is thus encouraging to note

that it can be killed selectively without damage to the grass by treatment with M.C.P.A. It has been previously shown that the weed is also controlled by D.N.O.C. suspension or by any of the proprietary D.N.O.C. compounds.

Alternanthea sessilis (Brède or Herbe Emballage, Serenti)

This weed, while present in most of the dry and medium rainfall districts attains prominence in the Grand Port district. It is not a particularly noxious weed but is somewhat difficult to eradicate by ordinary cultural methods, the creeping stems rooting at every node. Experiments on its control were carried out at Deux Bras where plots were treated with methoxone at 0.2 o/o, phenoxyl at 0.2 o/o and 0.4 o/o chloroxone, Dichlorophenoxyacetic acid at 0.5 o/o, 250 kilos per arpent agroxone, Denoc at 225 grams per gallon and Denocate at 270 grams per gallon.

The D.N.O.C. substances produced a temporary scorching effect but regrowth was vigorous. The 0.5 o/o chloroxone reduced the population of plants but was markedly inferior to the methoxone and phenoxyl. The latter substances (both consisting of M.C.P.A.) gave almost complete control of this weed. The control was such that only two plants had survived in the 200 sq. ft. plots. There was no marked advantage of the 0.4 o/o phenoxyl over 0 2 o/o. It may, therefore be concluded that almost complete control of Brède emballage may be obtained by one application of 0.2 o/o M.C.P.A.

The effect of sodium chlorate on Brède emballage was investigated at Mon Désert St. Pierre S.E. When sprayed with 10 o/o chlorate most of the weed was destroyed, occasional small pieces of stem which escaped the spray, rooted at the nodes and produced shoots.

Striga hirsuta (Herbe Feu, Herbe Feu à fleurs rouges)

This weed exerts its deleterious effect on cane growth through its parasitic habit on the roots of sugarcane, maize and other Gramineous plants. It is a particular nuisance in maize plantations the maize being apparently the most suitable host among cultivated Gramineae. By means of its haustoria or suckers it draws water and mineral salts from the host. The writer has been informed that on one large estate in the North the incidence of this weed has decreased remarkably during the last 15-20 years This was attributed to the change in varieties planted from the original White Tanna, followed BH. 10/12 and finally M. 134/32.

It is not clear whether there is a varietal susceptibility to infestation with this parasite or whether the deeper shade cast by M. 134/32 prevents the development of the weed.

In the island of Réunion maize plantations are stated to be severely infested with *Striga*.

It was found that the weed was very susceptible to M.C.P.A.; the plants being killed completely by one application of 0.15 o/o Methoxone.

Contact weed killers are not satisfactory as only the aerial parts of the plant are killed. No D.C.P.A. has been available for trial against this weed.

There is little doubt that this weed can be effectively and economically controlled by M.C.P.A. and probably by D.C.P.A. also.

Oxalis corymbosa (Oseille) and *Oxalis corniculata* (Oseilie filante)

Most cane fields are infested to a greater or lesser extent with these weeds particularly the former but, in general, planters regard them as being comparatively harmless, chiefly because, although perennials, they are seasonal in incidence. Oseille has only the leaves above ground and these develop in great profusion in the cool season but die off with the advent of the dry season, the plant being maintained by the underground corms which are developed in great profusion. Oseille filante has creeping stems which root at intervals and produce shoots which form a carpet-like growth. It is not so serious in cane fields as Oseille but is a bad lawn weed particularly in the drier districts.

Treatment of plots having a dense growth of Oseille with Sodium D.N.O.C., ammonium D.N.O.C. and D.N.O.C. suspension resulted in complete scorching of the leaves but within a week a large number of new leaves were produced. With respect to M.C.P.A. there was a critical concentration of 0.15 o/o below which, although damaged, the leaves were not killed and above which complete destruction of the aerial parts was obtained. In the early part part of the cool season (May-June) a formation of new leaves occured following treatment with 0.2 o/o M.C.P.A. though the new growth was less vigorous than the original stand. In the later part of the cool season (August — September) there was no regeneration of leaves following treatment with 0.2 o/o M.C.P.A. The corms were not killed at either period, the effect of the M.C.P.A. at the end of the cool season merely brought on the dormant condition.

Oxalis corniculata (Oseille filante) is considerably more resistant to M.C.P.A. than *Oxalis corymbosa*. Apart from a temporary scorching effect it is hardly affected by concentrations of M.C.P.A. upto 0.3 o/o. In lawns a temporary suppressing effect was obtained by the application of a heavy dressing (600 Kilos per arpent) of the solid agroxone (containing 1 o/o M.C.P.A.). The weed was not completely destroyed even by this high

application. It is doubtful whether the treatment of Oseille in cane plantations would be justified unless the weed was in association with other noxious weeds susceptible to treatment with M.C.P.A.

Hydrocotyle asiatica (Boileau) and *Hydrocotyle sibthorpioides* (Petit Boileau)

The former of these sometimes becomes a nuisance weed in cane fields particularly in the wetter parts of Savanne. The latter seldom invades cane fields to any great extent but is a bad lawn weed in the uplands. They both belong to the same genus as Herbe Bol (*Hydrocotyle bonariensis*) and respond in a similar way to treatment with M.C.P.A. or D.C.P.A., though they are somewhat more resistant. A concentration of 0.2 o/o is required to produce a good kill of the aerial parts and small quantities of the herbicides will subsequently be required to deal with new growth.

In lawns, somewhat better results were obtained with agroxone dust than with liquid sprays. A dressing of 200 kilos per arpent agroxone gave almost complete control of both weeds in lawns at Réduit.

Cuscuta reflexa (Cuscute) & other *Cuscuta sp.*

This weed is of little importance for the cane grower but is frequently of considerable concern to the general public.

A small species of Cuscuta was parasitic on the Herbe emballage (*Alternanthera sessilis*) in the trial plots used for the control of the latter weed at Deux Bras. The Cuscuta was killed completely by 0.2 o/o M.C.P.A. but as the host plant was also killed it was not certain whether the parasite could be killed without killing the host plant.

Further experiments were made in the Vacoas district on the control of Cuscuta growing on a hedge of *Duranta repens* (a shrub with leaves somewhat like Privet, and with blue flowers and orange-coloured berries). The Cuscuta formed a heavy matting over the hedge from 6 to 8 inches in thickness.

Sections were sprayed with M.C.P.A. at 0.2 o/o, 0.3 o/o and 0.5 o/o In all cases the Cuscuta was completely killed. The host plant lost all its leaves and many of the younger twigs died, particularly with the higher concentrations. The main branches of the host however, remained alive and eventually produced new leaves. In this case 0.2 o/o concentration was the most efficient, being effective in killing the weed and causing the least damage to the host.

It is thus established that *Cuscuta reflxa* can be killed completely by one appllication of 0.2-0.3 o/o M.C.P.A. If the weed is growing on a valua-

ble host plant, the reactions of the latter will have to be determined. *Duranta repens* is not killed by the concentration of M.C.P.A. necessary to kill the Cuscuta. Privet (*Ligustrum Walkerii*) on the other hand is killed by one application of 0.2-0.3 o/o M.C.P.A.

Commelyna benghalensis & Commelyna communis (collectively known as Herbe Cochon).

These two species are somewhat similar in growth habit to Herbe Emballage, being annuals with trailing stems 1-3 feet long which readily root at the nodes. They are hardly to be considered as very noxious weeds but are a nuisance in certain localities in the drier and warmer districts. They are both susceptible to M.C.P.A. the stems frequently automatically break up at the nodes following treatment with this herbicide. Thorough coverage of the weed when spraying seems to be more important than the actual concentration used. A 0.1 o/o solution is quite effective if the weed is adequately covered.

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RESULTS OF SOME PRELIMINARY INVESTIGATIONS ON THE CONTROL OF WEEDS IN MAURITIUS

DR. H. EVANS
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Part VIII — Further experiments on the Control of Herbe Bol, Herbe Chinois and Herbe Soltérino.

The results of preliminary experiments on the control of these weeds were published in Parts I & III of this series. The results presented were based on experiments carried out in the cool season It is well-known that the activity of the phenoxyacetic acid series of compounds is markedly affected by climatic conditions, temperature being particularly important. For this reason experiments on the control of these weeds have been repeated at monthly or even more frequent intervals to include the dry but warm months of September-October and to investigate the responses obtained in the rainy season with gradually increasing temperatures in conditions favourable to the maximum growth of sugarcane and other crops. The results of these experiments are now available.

General observations on the effect of weather conditions on the herbicidal activity of the Phenoxyacetic acid series of compounds.

It has been established that the absorption of M.C.P.A. and D.C.P.A. occurs not only through the aerial parts of the plant but also by subsequent gradual absorption through the roots. These may be regarded as a direct action on the one hand and a slow residual action on the other. Experiments carried out in Mauritius have shown that the direct effect is considerably more rapid as the temperature rises. Thus whereas in the cool months it took 5 to 6 days for the leaves of Herbe Bol (*Hydrocotyle bonariensis*) to turn yellow and 10 to 12 days for the aerial parts to shrivel, in the hot months yellowing was very marked within 3-4 days and the aerial parts were shrivelled in a week. Similar differences in the rapidity of action of these herbicides in the cool as contrasted to the hot season have been noted particularly with some annual weeds.

If the weed concerned is killed almost completely by the " direct action " effect and the " delayed residual action " is of little importance in attaining the destruction of the weed, a more rapid killing is obtained in the hot season as compared to the cool season Thus such weeds as Herbe Caroline (*Plantago lanceolata*) Herbe Bauga (*Jussiea suffruticosa*),

Herbe pistache (*Asystasia gangetica*), Vervein (*Verbena officinalis*) etc. are killed much more rapidly in the hot season than in the cool season, and the effect of the herbicides on such plants as Herbe Condé (*Cordia macrostachya*) etc. which were considerably damaged but not killed, in the cool season are considerably greater in the hot season.

If on the other hand, the delayed residual action plays a prominent part in the destruction of the weed various complicating factors enter into the problem. The chief of these complicating factors are :

(a) availability of the herbicide to the roots and other conditions affecting absorption of the herbicides by the roots, and (b) the decomposition of the herbicide in the soil.

The results of the experiments carried out at different seasons of the year with the phenoxyacetic acid herbicides under Mauritius conditions may be satisfactorily explained in terms of these factors.

The reactions of Herbe Bol to the application of M.C.P.A. and D.C.P.A.

The aerial parts of Herbe Bol are readily destroyed by the direct action effect but the complete eradication of this weed is particularly dependent on the slow absorption of the herbicide from the soil.

It is in this manner that the thick matrix of rhizomes is killed. In the cool, moist months almost complete control was obtained by a single application of 0.25-0.3 o/o M.C.P.A. After the initial kill of the aerial parts, new leaves continued to emerge but such leaves quickly became yellow and died. This process continues for six weeks or more though the number and size of such leaves progressively decrease. Finally the rhizomes died and rotted but two months or more may elapse before the death of the rhizomes is complete.

Plots which received one application of 0.3-0.5 o/o methoxone during the cool months have been inspected at intervals up to six months and there was no regrowth. Rhizomes from these plots which were transported to Reduit and planted in watered flats did not re-generate but gradually rotted away. Large scale demonstration plots treated once only with 0.2 o/o M.C.P.A. in August resulted in 85-90 o/o eradication of the weed : one of these plots was over ½ arpent in area.

Repetition of the experiments in the warm but dry month of October resulted in rapid kill of the aerial parts but new leaves emerged soon afterwards. These, however, did not turn yellow and die showing that the hormone was not entering these new leaves. Such leaves were tagged and their progress followed : they remained continuously healthy. It is believed

that at this time the herbicide could not penetrate to the absorbing roots owing to the dryness of the soil.

When the experiments were repeated in various localities during the warm moist months of December-February, death of the aerial parts was very rapid but new leaves emerged almost immediately. Those leaves emerging during the first week after the death of the aerial parts became yellow and died, but all the leaves which subsequently emerged were not affected, and remained healthy, making vigorous growth. Moreover, equally good results were obtained at this season with concentrations varying from 0.1 o/o to 1 o/o. It was apparent that 0.1 o/o concentration was ample to produce the maximum "direct effect" at this season but that even with 1 o/o the "slow residual effect" was not obtained. The explanation for this is that the herbicides, under the hot, moist conditions which exist in Mauritius in the active growing season, are rapidly decomposed in the soil.

Such decomposition of D.C.P.A. under controlled laboratory conditions in soil moistened to varying degrees and kept at different temperatures has been investigated by Mitchell and Marth (1946) in the United States. These workers found that the substance was inactivated within two weeks in moist warm soil.

The fact that new leaves emerging from treated Herbe Bol plants only yellow and die for a week after application of the hormone during the hot months whereas they continue to do so for up to five weeks in the cool season shows that inactivation of M.C.P.A. is remarkably rapid in the soils of Mauritius in the hot months. This conclusion has been confirmed by germinating radish and mustard seeds in soil taken from the treated plots two weeks after the treatments were applied. These seeds which are very sensitive to small concentrations of hormones, their germination being retarded or inhibited, germinated immediately in soils from plots treated with 1 o/o M.C.P.A., a fortnight after the application of the herbicide and there was no difference in the time for germination compared to untreated Réduit soil.

For these reasons, dense stands of Herbe Bol cannot be eradicated in the hot season by a single application of herbicide, whatever concentration of the latter (up to 1.5 o/o) is used.

Obviously, the way to overcome this rapid decomposition of the herbicide, is to make frequent applications of dilute solutions. Experiments to test this procedure have now been completed.

It was found that even with concentrations as low as 0.05 o/o rapid killing of the aerial parts of Herbe Bol was obtained providing the shoots were efficiently sprayed, this concentration being almost as effective as

0.1 o/o. There was, of course, considerable regrowth, but as soon as the new leaves has attained a sufficient size for spraying a second application was made which resulted in an immediate killing of these leaves. Formation of new leaves after the second application was much slower but was somewhat greater in the plots sprayed with 0.05 o/o compared to those sprayed with 0.1 o/o. After a third application of 0.1 o/o no new leaves have emerged to date, and control has been almost complete even with three applications of 0.05 o/o.

The conclusion is, therefore, that complete control of Herbe Bol may be obtained during the winter months by one application providing a high concentration of M.C.P.A. or D.C.P.A. is used, but that in the summer months complete control cannot be obtained by one application. Both in the winter months and in the summer months complete control can be obtained if the weed is sprayed three times with a concentration of 0.1 o/o and for practical purposes the control obtained with even two sprayings is sufficient to disrupt the effect of the weed on cane growth.

Comparative tests with various proprietary forms of M.C.P.A. and D.C.P.A. such as " methoxone ", " Phenoxyl " and " Weedone " showed that there was little to choose between them if the spraying was done in fine weather and was not immediately followed by rain. The formulation of the " Weedone ", however, is such that it was much less readily washed away by rain. In a trial when rain fell in 1-2 hours after the application was made the " Weedone " showed a marked superiority over the other brands.

There is now no doubt that M.C.P.A. and / or D.C.P.A. will play a dominant part in the control of this troublesome weed. The results obtained by spraying with dilute solutions of 0.1% (1 gallon of the active substance in 100 gallons of water applied to 1 arpent) are far superior to the best results that can be obtained by weeding by hoe, are cheaper, and after approximately three applications, complete or almost complete control of the weed may be anticipated.

Herbe Chinois (Artemisia vulgaris).

The results of a large number of experiments on the effects of M.C.P.A. in varying concentrations on this weed were recorded in part III of this series. Further experiments were carried out in the period November-February using M.C.P.A. and D.C.P.A. These experiments have shown that these subtances are more active against this weed in the hot season when the weed is actively growing. The two forms of M.C.P.A. available viz. Phenoxyl and Methoxone were equally active but the activity of D.C.P.A. was markedly affected by the formulation — the proprietary form " Weedone " being much more effective than the " Chloroxone " preparation. Experiments were carried out at Réduit using

concentrations of 0.1, 0.3, and 0.5 o/o at 100 gallons per arpent. The most rapid results were produced by "Weedone" particularly at the higher concentrations, the aerial parts of the plants being killed very rapidly. The M.C.P.A. compounds although slower in action also resulted in the total destruction of the aerial parts.

There were ridges running through each of these plots which were formed by the heaping of the weeds from previous weedings. Growth of the weed was considerably more luxuriant on these ridges.

On the level parts of the plots between the ridges very good control of the weed was obtained by the one application of 0.3 o/o and 0.5 o/o M.C.P.A. and D.C.P.A. On the plot treated with 0.5 o/o Weedone, particularly, the weed was almost completely eradicated and though somewhat slower in action the M.C.P.A. was also effective. There was, however, considerable re-growth on the ridges.

In the Réduit experiments the plots were only treated once but it is apparent that the weed population of the treated plots has been changed completely. *Cenchrus echinatus* (Herbe Cateaux) being now dominant. There are some shoots of *Artemisia vulgaris* in the treated plots, but the number of shoots represents only about 20 o/o of the original number in these plots.

Further experiments were made at Trianon S.E. using concentrations of 0.2 o/o-0.7 o/o M.C.P.A. and D.C.P.A. Unfortunately the spraying operation was followed very soon afterwards by heavy tropical showers. This reduced the efficacy of M.C.P.A. to a considerable extent but the "Weedone" formulation of D.C.P.A. produced very good though not complete control. Owing to the fact that the forms of M.C.P.A. available are water soluble, whereas D.C.P.A. not being soluble in water has to be formulated with various oily fluids such as Carbowax (polythylene glycol 400 mono oleate) as carriers, it is difficult to compare the efficiency of the pure substances, M.C.P.A. and D.C.P.A.

In small scale experiments at Reduit, Curepipe and Trianon, the "Weedone" formulation of D.C.P.A was somewhat more effective than the formulations of M.C.P.A. available, for the control of this weed.

The conclusions to be drawn from these experiments are that good control of Herbe Chinois, though not complete eradication, may be obtained by the use of these substances. It is estimated that two sprayings with 0.5 o/o concentration will give satisfactory control of this weed in cane fields if carried out when the weed is in active growth.

Further experiments have confirmed the fact that the best method of eradicating the weed is by spraying with 10 o/o sodium chlorate, but since (a) this substance is almost improcurable at present and commands

a high price and (b) it cannot be used effectively in growing canes without doing a certain amount of damage to the cane, it is recommended that the weed in cane plantations be treated with 0.3 o/o M.C.P.A., these substances having no harmful effects whatsoever on the cane plants.

Herbe Solferino (Ambrosia artemisifolia),

Experiments carried out on this weed in the summer months included M.C.P.A. and D.C.P.A. at concentrations of 0.3-0.5 o/o. No observations on the reactions of the weed to D.C.P.A. were previously available.

The weed was killed much more rapidly in the summer months than in the winter months and D.C.P.A. was equally effective as M.C.P.A.

When followed by rain soon after the spraying treatment was applied, "Weedone" proved to be the most rapid and effective herbicide. When applied under dry conditions both substances are equally active.

The reactions of the weed in the summer months do not necessitate any change in the recommendations previously made based on reactions during the cool season except that even better results may be expected when the weed is in active growth. One spraying operation with 0.3 o/o concentration of the active herbicide (i.e. 3 gallons of the commercial product per arpent) gives excellent control of this weed.

SEYCHELLES BOTANICAL TREASURE :

« The Coco-de-Mer » Palm (*Lodoicea maldivica,* Pers.)

by F DUROCHER YVON

" Palms the splendid offspring of **Tellus and** Phœbus, chiefly acknowledge as their native **land those** happy regions within the tropics, where the **beams** of the latter for ever shine ".— Von Martius.

I. *Introduction.*

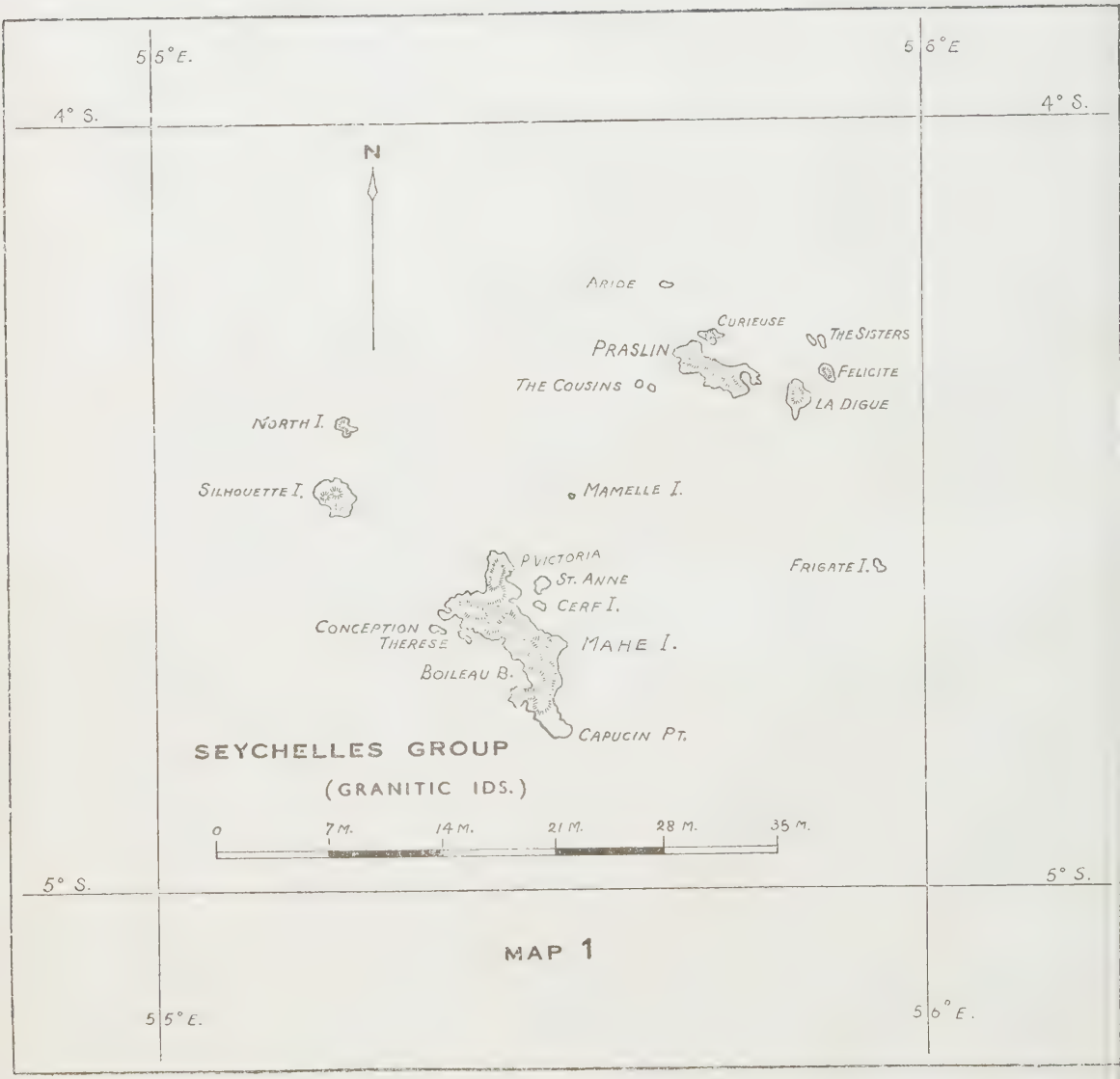
The echo of a glorious past, the remnant in a long-fought struggle for existence, the representative of an archaic race that does not want to die : the Coco-de-Mer palm, stands today in grandeur and beauty, in its natural environment, not throughout the Seychelles*, as commonly referred to, but solely on two islands (Praslin and Curieuse) out of a group of thirty three.

Long before the discovery of the Seychelles archipelago, the famous Coco-de-Mer nuts were known in the Maldive islands, as well as on the coasts of the Indian peninsula. The large, dehusked, empty nuts of strange, bi-lobed shape, were picked up after a long sea journey on shores distant more than a thousand miles from their country of origin, and as nobody knew where they came from, they were looked upon as a product of the sea, whence the name Coco-de-Mer or Sea-Coco nut.

As the average weight of a fully matured nut is about 30 lbs. and the specific gravity of the nut is about 1.2 the nut therefore sinks in water or sea-water. The nuts which were washed by sea currents to the shores of the Maldives must all have been empty, the endosperm (hard vegetable ivory) having partly or completely decayed. or else having been used up during germination, before they started on their long journey to these distant shores.

For centuries various stories tried to explain the origin of the strange nuts. As only cast up specimens were known, they were therefore thought to grow on a submarine plant. Soon the origin of the nut crept in mariners' tales : it was produced by a tree that came above the surface of the sea and in it lived a huge vulture bird and mariners would be attracted to the place and there, would be devoured by the monster. No wonder that for centuries the Coco-de-Mer nut was looked upon, not only as a uni-

*Palms to be seen in Mahé have been planted from nuts from Praslin.


55° E.
56° E
4° S.
4° S.
N
ARIDE
CURIEUSE
THE SISTERS
PRASLIN
FELICITE
THE COUSINS
LA DIGUE
NORTH I.
SILHOUETTE I.
MAMELLE I.
P VICTORIA
ST. ANNE
FRIGATE I.
CERF I.
CONCEPTION
THERESE
MAHE I.
BOILEAU B.
CAPUCIN PT.
SEYCHELLES GROUP
(GRANITIC IDS.)
0
7 M.
14 M.
21 M.
28 M.
35 M.
5° S.
5° S.
55° E.
56° E.

MAP 1

versal panacea for various aliments, but also as a precious and powerful talisman. It was esteemed as a sovereign antidote to poisons and was supposed to possess highly aphrodisiac properties. On account of this, the nut kept a long time commanding exorbitant prices in the East.

Soon the West heard all about it from the East, and Kings and Princes in Europe were prepared to pay a fortune for the possession of one of these nuts. History reports that Rudolph I of Hapsburg offered the incredible sum of 4,000 gold florins for one of these nuts.

Mystery and legend, myth and superstition, were shattered to pieces and truth brought to light by the discovery of the palm on Praslin island in 1742. Messrs. Duchemin and Brayer du Barré in the second half of the 18th century loaded a ship with Coco-de-Mer nuts from Praslin and dumped the nuts on the Indian market in such numbers as to cause indescribable amazement to prospective buyers. It is reported that they sent so much that they had definitely ruined the possibilities of a good trade.

Today, the nuts are still being sold, at a cheaper price, in Singapore, Bombay and Karachi.

II. *Description of the Seychelles Archipelago.*

The Seychelles archipelago, situated in the Indian Ocean, South of the Equator, consists of two groups of islands of entirely different geological formation.

1. The granitic islands.
2. The coralline islands.

We are interested in the granitic islands only in this paper. There are 33 granitic islands and islets, of varying sizes, scattered into 3 main groups, lying between latitude 4° and 5° South and longitude 55° and 56° East. All the granitic islands lie on the Seychelles extensive bank and are all included in the 40 fathom line. A circle, with Port Victoria, Mahe's picturesque capital, as centre, and a radius of 35 miles, would include all the islands, (Map I). The 33 islands can be divided into three principal groups :

1. Mahé and its satellites.
2. Praslin and its satellites.
3. Silhouette and North Islands.

Frégate island, 30 miles East of Mahé, in splendid isolation, is like an onlooker on the 3 groups, as it belongs to none. The general configuration of all the islands is the same : steep and rugged. The larger island. are precipitously mountainous, the hills rising abruptly from the sea. Their size vary considerably : Mahé, the largest, is 17 miles long by 4 - 7 miles broad ; Booby and Beacon the smallest can be looked upon as mere rocks washed by the sea.

Mahé, the largest and most central island of the group, is 934 miles

N.N.W. of Mauritius, 970 miles E by N of Zanzibar and 600 miles N.E. of Cape Amber, the northernmost Cape of Madagascar (Map I).

The following areas of the most important islands are given as a guide :—

Mahé ...	...	area	55 sq. miles.
Praslin ...	...	,,	15 sq. miles.
La Digue ...	...	,,	4 sq. miles.
Curieuse ...	...	,,	1.4 sq. miles.
Silhouette ...	...	,,	7.6 sq. miles.

Praslin, the second largest island, is 23 miles N.N.E. of Mahé and is surrounded by 13 satellittes (Map II). We are interested in this group as the Coco-de-Mer is endemic to the main island, Praslin, and to its satellitte, Curieuse. Praslin is 8 miles long by 1 to 3 miles broad. Its long axis lies N-W. The configuration is steep and rugged, the conformation that of an irregular ridge running along the long axis (S.E. to N.W.) with numerous side hills and spurs. The average height of the ridge is about 1,000 feet, the highest peak in the centre of the island being 1,261 high. There are many other peaks which vary in height between 1,100 and 1,200 feet.

There are numerous valleys between the hills ; they are well watered and are very fertile.

The famous Vallée de Mai and Anse Marie Louise Valley are the only places where the Coco-de-Mer can still be referred to as growing under more or less primitve conditions.

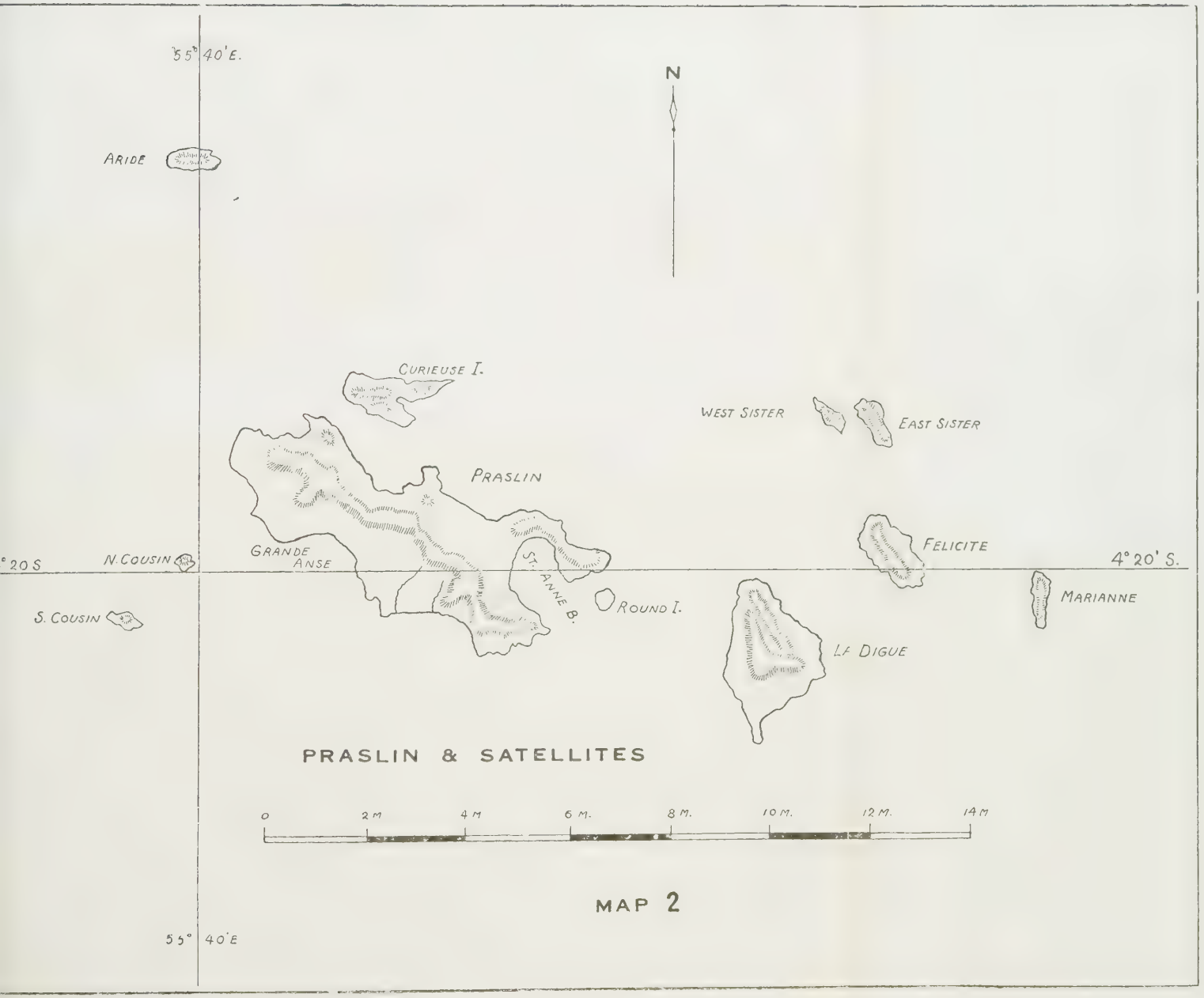
Large coral sand flats occur at sea-level. The coast line of the island is made up of rocky head lands or hills descending abruptly to the sea, which alternate with sandy bays.

The rainfall of Seychelles varies from year to year, the average at Mahé being 97 inches per annum. The distribution is far from perfect, and is often very erratic.

There is little variation in temperature throughout the year (Fig. I) the mean daily temperature being fairly constant and around 82° F. (27.7°C).

The climate is influenced by two monsoons : the South East monsoon which blows from May to October and the North West monsoon which prevails during the rest of the year. The South East monsoon is dry and is characterized by small showers whilst the North West monsoon is hot and wet and is characterized by heavy showers. There are periods of calms during the North West monsoon and both the strength and direction of the wind vary to a considerable extent. A high relative humidity prevails throughout the year, it seldom falls below 70 per cent and often rises up to 80 per cent.

The same conditions apply to Praslin except that droughts are more frequent there and the annual rainfall is less than that of Mahé, being around 70 inches.


55° 40' E.
N
ARIDE
CURIEUSE I.
WEST SISTER
EAST SISTER
PRASLIN
FELICITE
4° 20' S.
° 20 S
N. COUSIN
GRANDE ANSE
ST. ANNE B.
ROUND I.
MARIANNE
S. COUSIN
LA DIGUE
PRASLIN & SATELLITES
0
2 M
4 M
6 M.
8 M.
10 M.
12 M.
14 M
MAP 2
55° 40' E

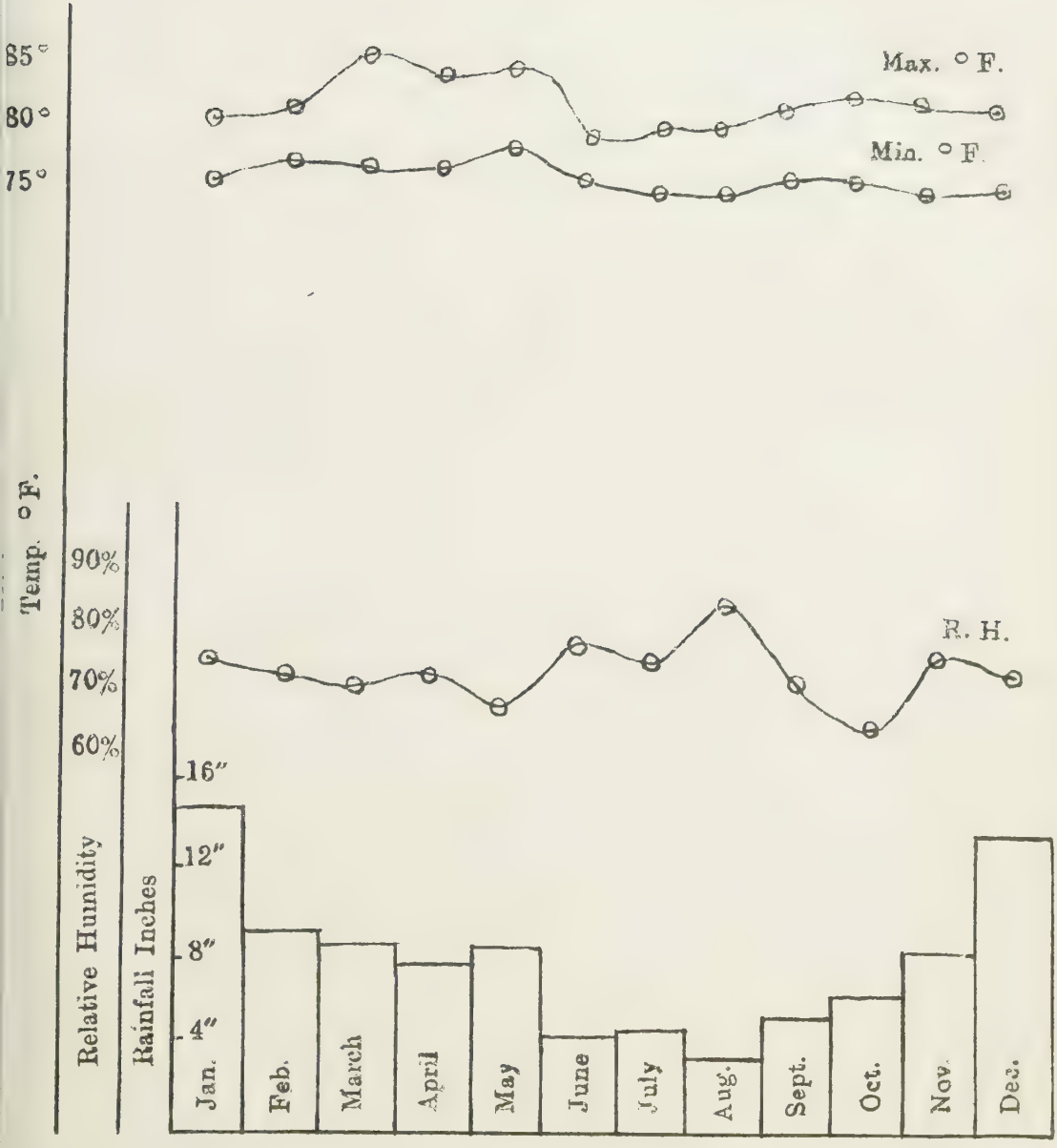


FIG. I. Average Rainfall (Inches), Temperature (°F) and relative Humidity, Mahé, Seychelles.

III. *Historitical review.*

The old Portuguese explorers in the Indian Ocean (1501-1562) used to describe the Seychelles as "*as sete Irmans*" and this name of the Seven Sisters remained attached to the islands until 1742.

It is reported that an English ship called at the Seychelles in 1609, but strictly speaking, the history of the islands does not begin until 1742, when Mahé de Labourdonnais, then Governor of the islands Ile de France (now Mauritius) and Bourbon, sent Lazare Picault, Master of the tartane 'Elizabeth', on a voyage of discovery North of Mauritius. Picault, on his arrival, anchored his vessel South West of Mahé in Bay Lazare, named after the intrepid navigator that he was.

His report, once back to Mauritius, must have been very favourable as his vessel was chartered for another expedition in 1744. It was then that he changed the name of the largest island from Ile d'Abondance to that of Mahé, after the renowned French Governor. During this second voyage he visited most of the islands including Praslin. On the 10th June 1744 he writes in his Journal: "Visite l'isle de Palme Praslin et l'île Rouge. L'isle de Palme ainsi nommée parcequ'elle porte beaucoup de palmiste et lataniers portant coton et l'isle Rouge parce qu'au milieu il y a une montagne dont la terre est Rouge". This is the first recorded description of Praslin and its vegetation and strange enough Picault does not mention the Coco-de-Mer particularly. He notes that the island is covered with palms, but does not seem in his description to differentiate the Coco-de-Mer from other palms. He must, however, have been well acquainted with the Coco-de-Mer. Du Roslan, later, in 1770 is more precise. He anchors off Praslin and writes in his journal: "Le 10 Février j expédiai la chaloupe avec un officier pour reconnaître les îles circonvoisines. Pendant ce temps je ramassai des Cocos-de-Mer germés et non germés. Quelque soin que je me sois donné je n'ai pu apporter à l isle de France (Mauritius) qu'un seul arbre avec ses palmes".

M. de la Pérouze on a voyage from Pondichery in 1773 was obliged to put in at Mahé and took the opportunity of visiting Praslin. He reports on the abundance of palms, especially of Coco-de-Mer palms "..... dans les intervalles existent en abondance des Cocos-de-Mer. L'isle Praslin en est couverte de la cime des montagnes jusqu'à la mer. Les feuilles de cet arbre longues et larges de plusieurs toises, servent de pont pour passer d'un rocher à l'autre".

Maillard and Ternay in their report on the Seychelles in 1775 state: "Cet archipel est également fort utile au commerce comme port de relâche et par la possession du coco-de-mer, fruit longtemps considéré comme une production de la mer et qui ne croit que dans les seules isles de Praslin et Curieuse. On lui attribue aux grandes Indes la vertu de contrepoison infaillible, il se vend cher et ne coûte que la peine de le cueillir. En Novembre 1769 le Sieur Duchemin est parti du Bengale avec la palle

l'Heureuse Marie et a été à Praslin pour prendre des Cocos-de-Mer. Il en a perdu le commerce dans l'Inde pour y avoir trop porté ".

The intendant Poivre, with his usual energy, foresight and love of plants in a letter from isle de France addressed to Delaunay in Seychelles, asks for Coco-de Mer planting material. "..... N'oubliez pas que vous m'avez promis de m'envoyer des Cocos-de-Mer en plants, tachez de les conditionner et de les embarquer de manière que ces plants arrivent ici vivants ".

Brayer du Barré, an enterprising Frenchman who started a small colony on St. Anne's Island, one of the satellites of Mahé, in his " Lettres et Memoires " (1770-1775) gives a good description of Praslin and of the Coco-de-Mer palm."..... les deux autres tiers de l'isle ne sont que montagnes escarpées pleines de roches et presque inaccessibles. Elles sont toutes couvertes de cocotiers de mer. Cet arbre autant que j'ai pu remarquer porte fleurs et fruits attachés à un régime, il a la feuille immensément grande et semblable à celle du Latanier. Ces feuilles ont entre leurs plis une ouate rouge et assez abondante, elle est portée par une branche ou coteau plein et poreux de 15 à 20 pieds de haut. Cette feuille est curieuse et une seule peut couvrir une case de 15 pieds Aucun autre arbre et aucune autre plante ne pousse à l'ombre du Coco-de-Mer."

Then follows a note about selection and collection of a large number of nuts which were eventually to be sold on the Indian market.

" Tous les cocos-de mer qui seront bien pesants, seront amassés avec soin et mis en magasin, tant sur l'isle Curieuse que sur l'isle Praslin, on donnera en préférence ses soins à rapporter sur l'établissement de Praslin les cocos-de-mer et les tortues que l'on aura ramassé sur l'isle Curieuse, pour n'en pas laisser à la disposition des bateaux qui pourraient y venir relâcher dans l'intention de les prendre sans les payer."

In 1776 Pierre Sonnerat a keen naturalist on his way to New Guinea called at Seychelles. He gives a lengthy description of the coco-de-mer palm in his " Voyage à la Nouvelle Guinée ". It is a pity that the pictures shown in his volume do not convey the right impression of what the palm really looks like in nature.

In 1786 the outstanding Mr. de Malavois — ingénieur géographe — was sent from Ile de France with most detailed instructions to report on the Seychelles. Mr. de Malavois published a complete report on the archipelago and compiled descriptions of every kind. His description of Praslin and the Coco-de-mer is worth full length reproduction here :

" Cette isle est formée par un amas de hautes montagnes de même nature et de même élévation que celle de l'isle Seychelles et les productions y sont généralement les mêmes à l'exception du coco-de-mer. Cet arbre croît non sur les bords de la mer comme le pourrait faire croire son nom, qui ne vient de ce que les premiers de cette espèce de cocotier ont été trouvés sur les rivages des isles Maldives, mais à une certaine distance des côtes et à une assez grande élévation au dessus du niveau des terres basses L'isle Praslin est couverte de forêts de cocotiers de mer. Cet arbre ne

croit que sur l'isle dont nous parlons, sur l'isle Curieuse, l'isle St. Pierre et l'isle Ronde ; il s'y est tellement multiplié qu'il serait très coûteux et très penible d'en diminuer sensiblement le nombre. Son bois n'est propre à rien, la coque de son fruit sert à faire des vases. Ce fruit quand il est vert, contient une gelée très délicate à manger qui se résoud en eau des qu'elle est exposée à l'air. Les feuilles du cocotier-de-mer sont immenses et disposées en éventail ; elles sont très commodes pour couvrir les paillottes ".

In 1792 Giseke describes the palm as *Borassus Sonnerati*. In 1801 Labillardière describes it in the Annales Mus. Histoire Naturelle, Paris (ix, 140t. 13) under the name of *Lodoicea sechellarum*.

In 1827 J. Hooker from material supplied from the Seychelles gives a full account of *Lodoicea* in the Botanical Magazine.

In 1877 Dr. Balfour, in Baker's Flora of Mauritius and the Seychelles describes the genus *Lodoicea* (Commerson) and its single species, the coco-de-mer as *Lodoicea sechellarum*.

In 1892, Charles Alluaud, a French naturalist, in his " Voyage aux Iles Sechelles " published in " Le Tour du Monde " devotes a chapter to the Coco-de-mer. There is a beautiful engraving representing the Coco-de-mer growing on Praslin island, in its natural environment.

More recently P. R. Dupont (1958), Desmond Vesey-Fitzgerald (1940) and Professor Bailey have been interested in the Coco-de-mer. Professor Bailey (1912) has published a paper entitled Palmae Sechellarum, in Gentes Herbarum, which now stands as a standard work of reference on Seychelles palms.

The present writer has been interested in the Coco-de-mer since he first came to Seychelles. He has worked for a period of over 2 years on both Praslin and Curieuse on the Coco-de-mer palm, where he has collected in the field the necessary information which forms the subject of this paper.

IV. *Classification.*

The Coco-de-mer belongs to the Natural Order Palmae, tribe Borassae and genus Lodoicea. The specific name is *Lodoicea maldivica*. Pers. The name *maldivica* dates as far back as Rumphius *Cocus maldivicus*. With the systematic classification of palms the specific name of the Coco-de-mer was changed from *Cocos maldivica* Gmel., to *Borassus Sonnerati* Giseke. Commerson introduced Lodoicea and Labillardière described the palm as *Lodoicea sechellarum*. Systematic classification brought the name back to *Lodoicea maldivica*.

V. *The Root System.*

A study of the peculiar root system of the coco-de-mer is of great interest.

As should be expected in a tall tree exposing a large leaf area to the action of strongs winds, this palm is provided with an extraordinarily powerful root system.

Two men working under the supervision of the writer took more than half a day to dig a 30 foot palm growing in sedentary hillside laterite soil.

The seedling retains the tap root with its secondary roots (in acropetal succession) for a very long period (see germination). As the seedling gets older fresh roots are formed in large numbers from the base of the stem. These fibrous roots are protected by a thick hard sheath of sclerenchymatous tissue.

When the root system of a mature palm is examined the base of the stem is seen to abut in a large hemispherical bowl-like structure (Fig. II, a) made of hard sclerenchymatous tissue. In a large number of specimens examined the diameter of the bowl was found to vary between 1' 6" to 2' 6" and the depth between 6" — 10".

The bowl is pitted all over its internal surface and has the appearance of a thick sieve with oval holes 1 to 2 cms. in diameter (Fig. II, b). Further study shows the thick shell of the bowl to be formed by fusion of the hard protective sheaths of the roots at their point of origin, both sheath and bowl being made of the same hard material. This material is highly resistant to decay, as may be seen on the hills of Praslin where numerous bowls with protruding tubes (root sheath) still exist, whilst the palms which stood in them died centuries ago.

There is a continuity in the tissues of stem and roots through the pits of the bowl. At the expanded base of the stem there are always present a large number of tiny black roots forming a thick network on the soil surface. These tiny roots form a thick mat which lies within the one foot circumference around the base.

The roots of the coco-de-mer do not as a rule travel very far vertically into the soil. In the first 6" of soil profile there are a large number of thin whitish roots 1/16" in diameter. Their range is within the 3' circumference.

In the 6" — 12" horizon the roots are thicker, brownish in colour and are about $\frac{1}{8}$" in diameter. They travel horizontally much further than those of the previous horizon, sometimes to a distance of 8' to 10' from the base of the stem.

In the 1' — 2' horizon the roots are at their maximum thickness ($\frac{1}{2}$" to 1"). The range here is quite considerable : they lie within the 12' circumference. In this horizon, in the specimen examined, the number of roots per sq foot of soil profile was as large as fifty, which indicates that the palm is very strongly anchored.

In addition to the main roots described above there are a large number of branch roots to every horizon. It is significant, however, that no roots have been met below 2½'.

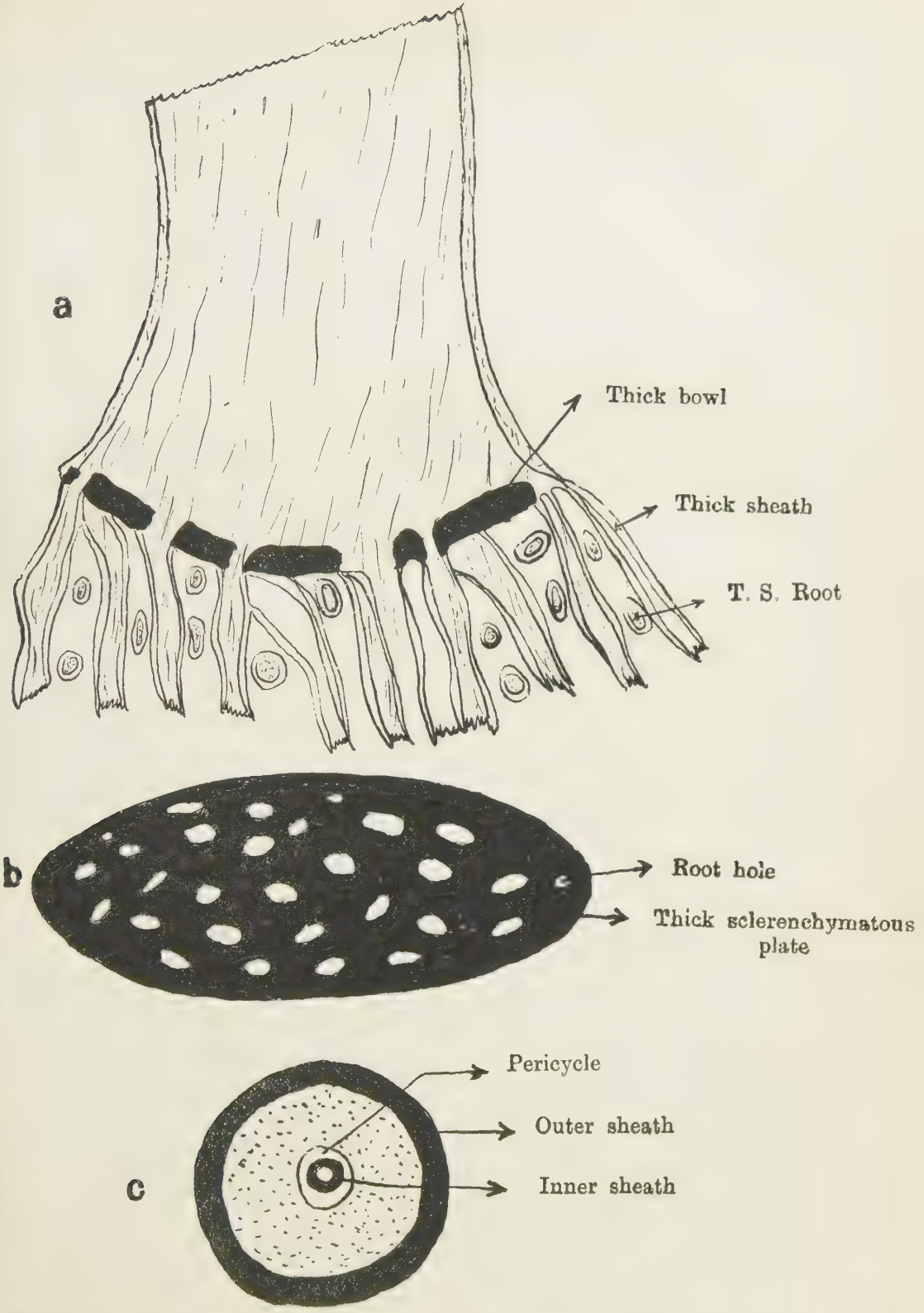
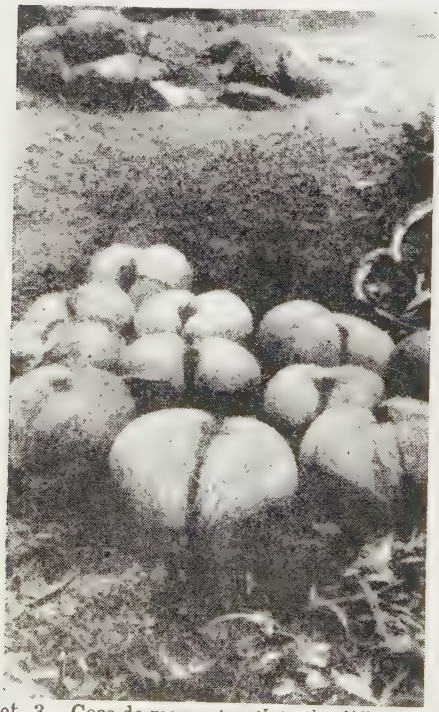


FIG. II. Longitudinal section of the base of the stem (a). Bottom of bole seen from above (b). Transverse section of root 1" thick (c).

PLATE I

Phot. 1. Tall coco de mer tree, Midlands, Praslin.

Phot. 2. Female tree bearing a good crop of fruits, Praslin.



Phot. 3. Coco de mer nuts. Note the difference in shape. Top left, one germinating nut.

Phot. 4. Germinating nut, with first leaf expanded. Praslin.

A sketch of the cross section of a root 1" in diameter is shown in Fig. II c. It is furnished with an outer thick black sclerenchymatous sheath. Within this sheath there are a number of strands embedded in a more or less soft matrix. Within this there is a softer ring of tissues and it is from this area that the endogenous branch roots take off (pericycle). Within this again there is a small black ring of hard sclerenchymatous tissue (very much like the outer sheath) surrounding the central soft whitish tissue.

VI. *The Stem and Leaves.*

The stem is erect, woody, spineless and marked with leaf scars which are not easily detected with old age. It is frequently of great height reaching up to 100 feet and carries a crown of flabelliform leaves (plate I phot. 1).

The sight of a tall solitary coco-de-mer tree in full bearing with its crop of green glossy fruits is certainly the most remarkable object in the vegetation of Praslin. Once the stem is formed it does not increase in thickness, which is kept uniform throughout its length except for the base where it expands to fit into its strange socket as described above. The diameter varies between 12" — 16" and the diameter at the base is about 18" — 26".

When a cross section of the stem is examined a large number of hard fibrous strands are seen scattered in a matrix of softer tissue, the whole being enclosed in a thick strong rind The density of the strands is higher towards the periphery than towards the centre. This arrangement may help to resist lateral strains during violent gales.

The strands are whitish in colour except for a peripheral thin layer which is ebony black.

The crown is a dense head of dark green foliage with a shiny appearance, and is most beautiful when the palm is young (15 to 20 years old). In very old specimens (some of which are reported by Dupont to be 800 years old) when the stem shoots into the air, like a telegraphic pole, to a height of over 100 feet, the crown then appears ridiculously small against the sky line (Plate I phot. 1).

Plate II illustrates the crown of a staminate plant : the crown is compact, the internodes being very short. The leaves, as is the rule with Borassan palms, are flabelliform, the petiole running right through the lamina to the end (Costapalmate). They are plicate at the base, flabellately cut with bifid segments and bear a brownish scurf on the under surface. The leaf is of enormous size. The petiole varies in length between 8' — 20', and the blade is from 10 — 16 feet long and 5' to 8' broad. It is during the early part of the life of the palm that the leaves are at their greatest beauty. I have come across a fair number of seedlings (3 — 5 years old) and young palms (10 — 15 years old) where the total length of petiole and blade combined was over 40' — the blade itself being 15'

long and 10' broad. Visitors to the Vallée de Mai, a coco-de-mer reserve, are struck by the size of the leaves of some of the seedlings growing there.

The rate of leaf development depends on various factors the chief of which is soil fertility. The rate may be very slow : in several cases the writer observed that three leaves were produced per annum but some palms produce two or even one leaf per annum.

The number of leaves to a tree will usually range from 20 to 30 ; in young palms the number of leaves is always less. The number of leaves on three trees known to be 40 years old were as follows : 25, 26 and 28 the first two being staminate trees and the third a pistillate tree.

The petiole is green, unarmed, wide, thick and heavy In the seedling it is triangular in cross section, but later on it flattens out and becomes deeply grooved on its upper surface, the lower surface meanwhile assuming the shape of a rounded keel. It is wider where it clasps the stem and splits at its base over a distance of 1' to 2' along its length. Very often a bunch of nuts is seen hanging through the gaping opening of the petiole base The leaves with their deeply channelled petioles direct the flow of water down the trunk. This water prevents the vegetative bud in the centre of the crown from drying out and also supplies the base of the palm with moisture for the roots.

During rain, except for the area immediately surrounding the base of the palm, there is a large area within a circumference of 15' or more which is left completely dry. Outside this area raindrops fall from the drooping ends of the leaves.

During heavy rains the palms growing along the Grand Anse — Baie St. Anne's road afford excellent protection to passers by. I remember having stood underneath the crown of a palm when it was raining heavily and yet kept quite dry as if I were indoors. The guardian living in the coco-de-mer reserve who had taken shelter under the same tree told me in colourful language that he considered the coco-de-mer palm to be a most intelligent tree as it kept all the water falling on its leaves to feed its roots. He also added how he appreciated the tree growing by his hut because on rainy days there was no need for him to go to the river as he could collect any amount of water by placing various containers close to the stem.

VII. *Flowers and Fruits.*

The coco-de-mer palm is dioecious and the palm does not commence to flower until it is about 25 years old.

There are many palms which are known to be over this age that have not yet put forth their flowering shoots.

The rate of production of male and female flowers is very slow. It

PLATE II

Staminate palm with two catkins.

PLATE III

Branch of four fully developed fruits. Note the aborted fruits.

varies with soil fertility, but four flowering shoots per annum can be taken as a good average.

The staminate and pistillate flowers are borne in axillary spadices, free from a covering spathe, but provided with large strong bracts at the base.

(a) *The Male Inflorescence* (Plate II)

The male inflorescence is a fat brown catkin borne on a rachis 1" in diameter. The spadix, cylindrical in shape, is 3' — 4' long and 3" — 4" thick and tapers towards its end.

The flowers are produced in clusters in hollows of the axis and each flower is substended by a bracteole. In the hollows are immersed lenticular bodies consisting of compressed bracts, and on the edge of these bodies, towards the periphery of the catkin, the yellow flowers (which number as many as five hundred to a catkin) are borne. The number of stamens varies from 16 to 36.

When the male plant is in bloom the florets emit a very strong but pleasant smell reminding one of honey. They are visited by bees (in large numbers), ants and various dipterous insects.

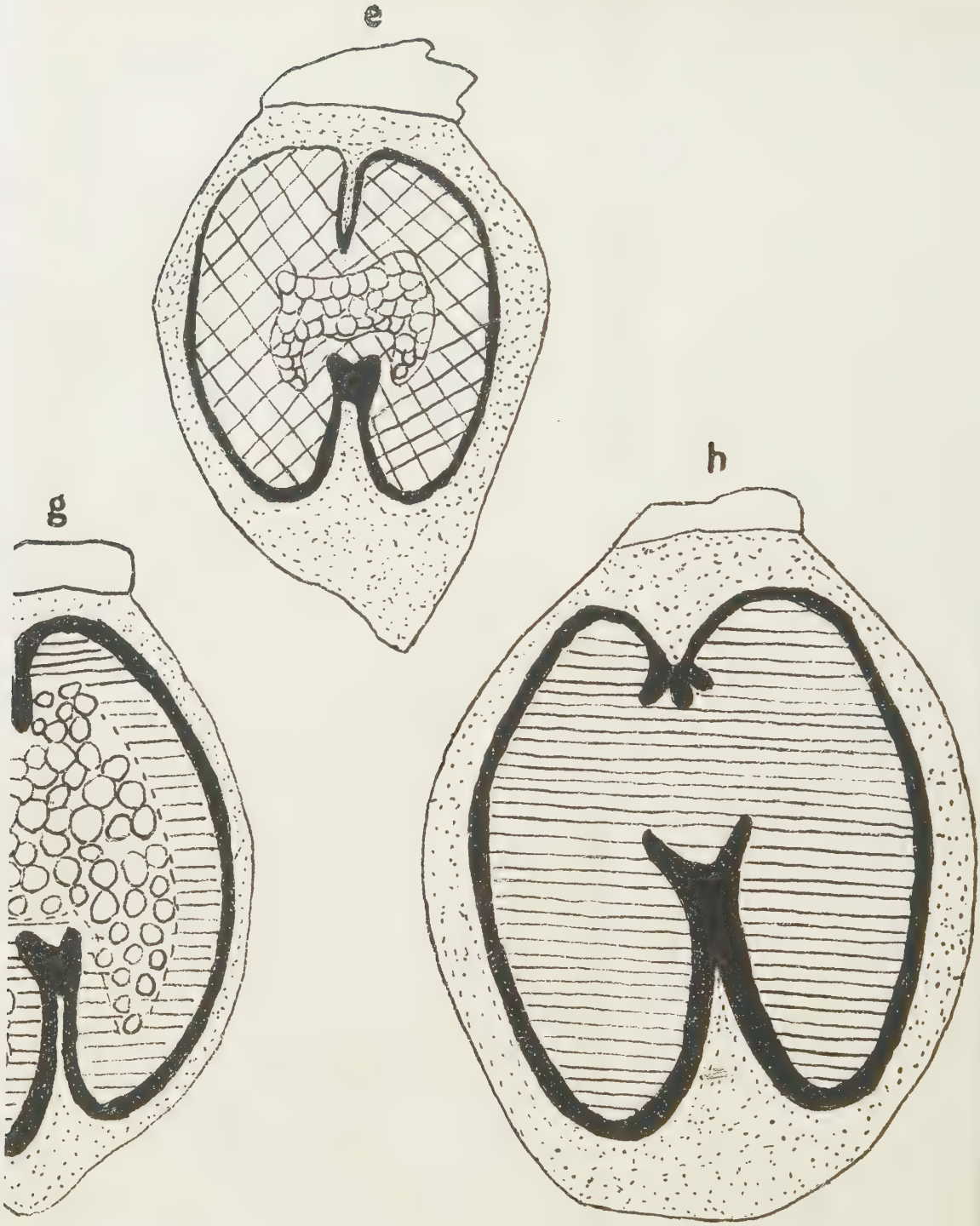
As a rule only one catkin is produced from the bract at the base of the rachis but occasionnally two catkins can be seen hanging from the same bract.

(b) *The Female Inflorescence* (Plate III)

The female flowers, fewer in number (5 to 13) than the male, are borne on a zigzag rachis 4' long and 2" thick. The rachis is swollen at the insertion of the flowers and has the appearance of a crooked stick with large knobs.

Normally only one female spadix is produced in the axil of a leaf but sometimes twin spadices are produced from the same axil.

The large pistillate flower (5 cms. long) is contained in a cup formed by a pair of hard bracts and consists of six scale leaves enclosing 3 carpels each containing an ovule. The ovules are protected by a thick fibrous fruit wall which exists long before the stigmas make their appearance through the perianth. At the apex of the carpels are 3 stigmas each with a bifid end. When the flower opens the exposed stigmas turn yellow and secrete a sticky viscous fluid to which pollen will adhere when blown by the wind or carried by insects. Various insects attend to the female flowers but no bees have been seen visiting them — the bee as has already been said regularly visits the male inflorescence. At this stage the flowers are receptive and artificial pollination is carried out throughout the Seychelles wherever there is an isolated female plant. This is done either by applying to the female flowers the pollen collected from a male catkin, using a brush or else by hanging a male catkin on top of the female inflorescence and leaving it there.



) Fruit two months old (c) Fruit four months old. (d) Fruit five months old
(g) Fruit three years old. (h) Fruit seven years old.

Soft jelly-like tissue

Hard 'vegetable ivory'

the Seychelles. It is odourless, practically tasteless, save sometimes for a slight nutty flavour, generally colourless except for fruits collected from one palm in the Anse Marie Louise reserve which produces a pink jelly. From this stage onwards, the fibrous mesocarp becomes thin and dry, the soft brown endocarp becomes hard, horny and black, whilst the soft jelly-like endosperm gradually sets to a very hard tissue ressembling ivory. These changes are slow and take place over the remaining 5 years of development. As opposed to the first change in constitution of the endosperm where the differentiation of tissues started from the centre towards the periphery, in this final change the differentiation takes place from the periphery towards the centre.

A three years old fruit (Fig. IIIg) shows in longitudinal section a thin green epicarp followed by the fibrous mesocarp, which by this time has greatly diminished in size. Next comes the hard bi-lobed endocarp enclosing the endosperm. The outer part of the endosperm is, at this stage, hard like ivory whilst the central part is still the same soft edible jelly-like tissue. This setting of the endosperm continues until the hard vegetable ivory completely fills the endospermous cavity (Fig. III h). The embryo is situated at the basal sinus between the two lobes of the endocarp. The fruit is then over six years old and ready to fall.

The increase in weight and length of the fruit during development is shown in the following table :

Age of fruit	Wt. in kilos.	Length in inches.
2 – 3 months	1 kg. 700	8.5"
4 months	3 kgs. 200	12"
1 year	—	18"
over 6 years	15 kgs.	19"

A large number of ripe nuts were weighed and their weights varied from 12 to 20 kilos. One fruit with multiple nuts (three) weighed, when it fell to the ground, as much as 45 kilos.

The average composition of the mature fruit is as follows :

Husk	29.2 o/o
Shell	10.8 o/o
Endosperm	60.0 o/o

and the chemical composition of the endosperm as reported by the Imperial Institute is :

Moisture	14.1
Fat	0.3
Crude fibre	4.0
Crude proteins	4.7
Ash	1.0
Carbohydrates (by difference)	75.9

No true starch present

The yield of nuts varies within wide limits and depends on various factors the chief of which are age and soil fertility.

As many as seventy nuts have been counted to a tree but the average crop is well below this. The number of nuts to a bunch is variable as all the flowers do not normally set. Very often from a bunch of 9 flowers only 3 develop; the average number of nuts to a bunch is about four.

(*d*) *Seed Dispersal.*

The heavy ovoid fruit falls to the ground and a bounce will take it a few feet or a few yards, from the mother plant according to the terrain. Trees growing on the slope will have the tendency to concentrate their nuts lower down below and this explains why there is a concentration of palms in the two famous valleys of Praslin.

Praslin has been reported to be covered with coco-de-mer palms right up to the hill tops by various navigators. This is more difficult to explain than the concentration of palms in valleys. Here it means that the nuts must ascend the slope and the only possible explantation is that palms growing on the lower slopes of a hill would produce a small percentage of fruits which when they fell would be buried deep in the thick litter of dead palm leaves a few feet higher up the slope than the parent plant. These nuts on germination would produce a sinker which would travel for some distance horizontally up the slope and then would penetrate the soil. Thus a certain distance would be secured up the slope between parent and offspring. Another explanation would be that during the trend of evolution the palm first made its appearance on hill tops and then gradually moved down hill.

However, the reports of the early navigators are correct, for today dead coco-de-mer roots are to be found not only in valleys but on both the middle slopes and higher slopes all throughout Praslin.

(*e*) *Germination and Development of the Seedlings.*

Germination in *Lodoicea* is a most fascinating subject on account of the peculiar way in which the embryo is transferred from the endosperm, along with a sinker, to a depth of over 2 ft. below the soil surface.

Under natural conditions the fruit falls to the ground, fermentation starts in the husk which develops a pleasant aromatic smell in the early stages, and finally disintegrates and germination starts a few months later.

The practice on Praslin and Curieuse is to collect all the fruits, dehusk, and store the nuts in large heaps. Nuts selected for germination are put aside for a few months and then are placed on the soil surface in a moist place to germinate. Many inhabitants of Praslin firmly believe that they can tell the sex of the future tree by the shape of the nuts, which they differentiate into ' male ' and ' female '. This belief must how-

ever be rejected as nuts originally planted at the Botanical Gardens and selected according to shape were expected to give rise to male trees only on one side of the entrance to the Gardens and to female trees only on the opposite side, whereas with coming years each row proved to be a mixture of both male and female plants.

The embryo, immersed in the large endosperm, is situated at the top part of the basal sinus where the two lobes of the endocarp meet. In the same region there is a large micropyle about 3 cms. in diameter.

The expanded base of the cotyledon carrying the embryo at its extremity grows as a thick shoot or sinker towards the micropyle whilst it develops at the other end a large haustorium which grows towards the central cavity of the endosperm. Enzymes are produced in the haustorium which attack the hard endosperm and break it down to a softer tissue.

The endosperm does not contain true starch but the haustorium or 'apple' contains both starch and sugars. The snowy white haustorium sometimes pale yellow — consists of a soft spongy tissue which is edible and which is very much like the familiar haustorium produced during the germination of the coconut. The only difference is that the coco-de-mer haustorium is much bigger and is bi-lobbed.

As germination progresses the expanded base of the cotyledon (carrying the embryo) passes through the micropyle as a geotropic sinker or shoot. This shoot, once out of the micropyle, if it does not meet with any obstruction, penetrates the soil. If however, it strikes a hard surface such as a rock it will travel horizontally for some distance and then will penetrate the soil.

The embryo travels along with this growing shoot or sinker in such a way that it always remains at the extremity of the shoot, in the region of the growing point. Four months after the commencement of the germination the sinker has grown about 6" in length and is of a uniform thickness of 1". The growing embryo, at the extremity of the sinker, is at this stage 1" long and 1/10th" thick. Next the sinker swells up and lengthens until a spindle shaped body 3½" thick and 1½ long is formed. This body tapers into a thick tap root about 4" long. The embryo during this time develops rapidly; the plumule protected by a hard sheath travels centrally upwards in the spindle which acts as an organ for the transfer of food and at the same time affords excellent protection to the embryo. At the top end of the fat portion of the sinker it pierces the surrounding tissues and escapes from the spindle to work its way to the soil surface through the covering layer of soil which is 6" — 8" thick. It is protected by a hard pointed sheath which comes above the soil surface for about a foot before the sheath eventually splits to let loose to the light and air the first leaf of the young plant (Plate I, phot. 4).

There is a corresponding growth of the radicle at the bottom part of

the spindle and secondary roots develop endogenously from the radicle. Whilst these changes are taking place, the haustorium grows in size, consumes the endosperm and fills the cavity between the two lobes.

Fig. IV illustrates the longitudinal section of a nut 2 months after germination has commenced. The haustorium is quite small and the sinker or growing shoot has not yet come out through the micropyle.

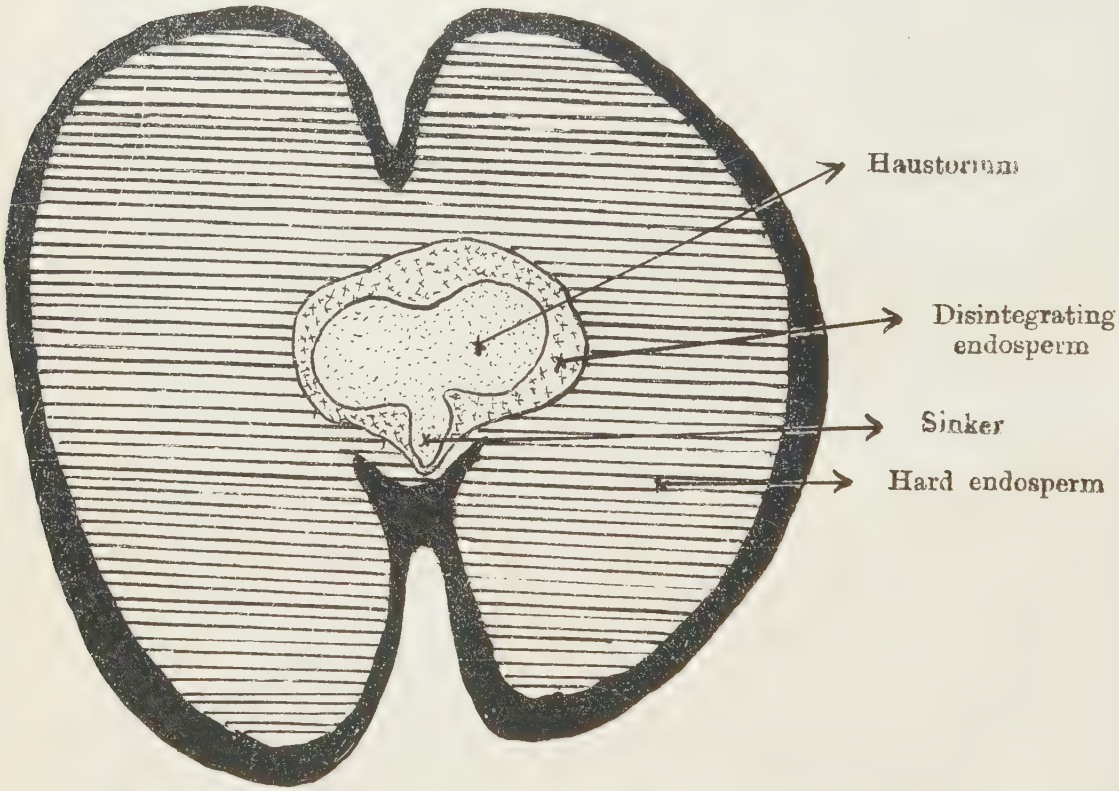


FIG. IV. Early stage of germination. (Longitudinal section of fruit).

Figs. V (a) and (b) and fig. VI illustrate the development 6 and 11 months respectively after germination has commenced and show the sinker or rope which flattens into the spindle shaped body which encloses the developing embryo.

Three years after germination has commenced there is still connection

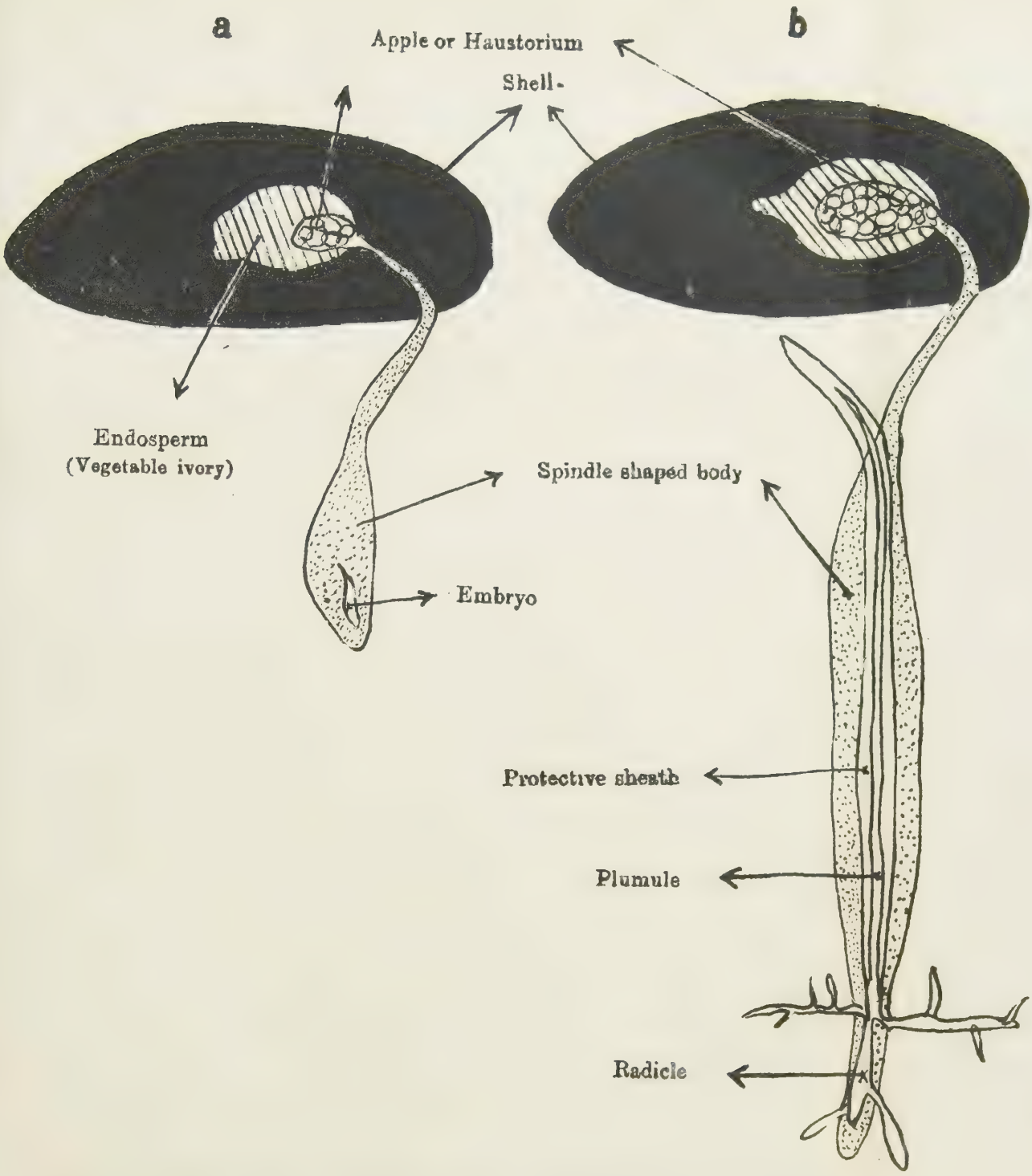


Fig. V. Germination. Longitudinal section of nut (parallel to sinus). ×1/5.
a. six months after germination has started
b. twelve months after germination has started.

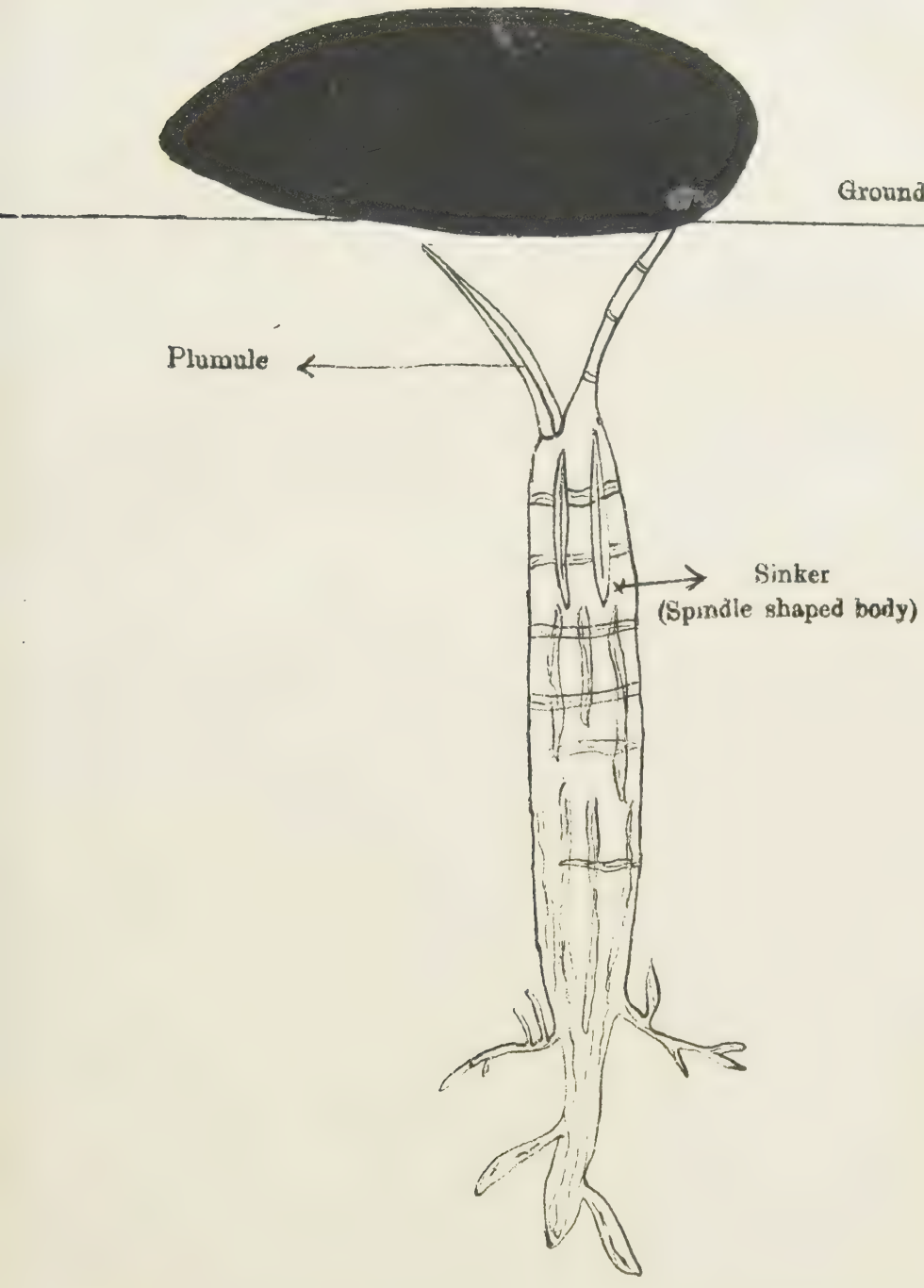


Fig. VI. Germination. Advanced stage (one year after germination has started)

Coco de mer palms in their natural environment Vallée de Mai, Praliu. Note the tall male palms, the female plant with crops, and seedlings in the foreground.

between nut and seedling until finally the sinker rots and the seedling carries on its life independently.

The rate of development of the seedling after this is rather slow and depends mainly on the fertility of the soil.

VIII. *Ecology.*

The island of Praslin was reported by early navigators to be covered with palms. Picault described the island under the name 'Ile de Palme' or Island of Palms. In the past *Lodoicea* must have had a very extensive and even distributionon both Praslin and Curieuse. It has certainly occured on Round Island, though there are no living specimen on this island nowadays. However the presence of sockets on this island is the best indication that at one time Coco-de-Mer palms stood in them.

Praslin is surrounded by 13 satellites and it is most extraordinary that the palms never occured on any of the other satellites apart from Curieuse and Round. Palms were the predominating elements in Praslin's original forest and the Coco-de-Mer certainly occupied a dominant place in the Palmetum. Owing to its gregarious habit it must have occured in almost pure stands in a large number of places all throughout the island.

To day *Lodoicea* occurs in scattered groups throughout Praslin and the smaller island of Curieuse to the North. Apart from scattered "relic" trees, it is now growing more or less under natural conditions in the Vallée de Mai (plate IV) and in the Anse Marie Louise and Fond Ferdinand reserves. The Coco-de-Mer reserves of Praslin are curiously enough, frequented by the endemic black parrot *Coracopis Barklyi*. This bird occurs in the reserves in very small numbers and is most probably on the verge of extinction.

The famous Vallée de Mai is a private reserve forming part of the Nouvelle Découverte Estate belonging to Mr. France Jumeau. Mr. Jumeau gave an assurance to the Government of Seychelles in 1935 that he would do everything in his power to preserve an example of the original forest of Seychelles. This forest and the Coco-de-Mer valley are contiguous. Through the owner's love of plant life this reserve has been jealously guarded from destruction by fire or felling.

The valley is situated in a good catchment area. It is well stocked with coco-de-mer trees, the number being estimated at about 4,000. The area has been cleared of exotic species which invaled the original forest when the canopy was opened possibly by fire. The larger part of the reserve is maintained in a clean condition by the regular collection of fallen leaves, male catkins etc, which practice lowers the possibility of destruction by fire.

At the entrance to the valley, where a stream flows along the Grand Anse — Bay St. Anne's road the grove is left untouched. There the coco-de-mer grows with its natural associates, the endemic palms and pandani. The ground is here covered to a depth of several feet with a tangle of

fallen leaves of palms and pandani. Some excellent seedlings of coco-de-mer are present: a 14 foot long leaf borne on a 30 foot petiole is a remarkable sight which is not uncommon.

The Anse Marie Louise — Fond Ferdinand reserves are Crown Lands which were acquired on Mr. E. John Horne's recommendations after his visit to the area. He considered that if these palms were destroyed it would be "an insult to science and a disgrace to civilization". This reserve is situated in the Southernmost part of Praslin and is 70 acres in extent.

The Anse Marie Louise valley extends from about 50 feet above sea level to a height of 500 feet. The valley is strewn with boulders and a stream runs underground to within a short distance of the coast. At Anse Marie Louise the coco-de-mer has to compete with various indigenous and exotic species, the chief of which are: Agati (*Adenanthera pavonina*), Badamier (*Terminalia catappa*), bois Noir (*Albizzia Lebbek*) and Cashew (*Anacardium occidentale*). The coco-de mer palms tower above this secondary formation which rises to a height of about 50 feet. Some of the male palms in this valley are estimated to be 125 feet in height. Unfortunately many fine trees are unsound and will fall in coming years.

The floor of the forest is covered with dry palm leaves and is bare of vegetation, save for coco-de-mer seedlings and exotic saplings. Coco-de-mer seedlings are well represented but they have to compete with other saplings of the secondary vegetation.

The Fond Ferdinand reserve is a ridge adjoining the Anse Marie Louise valley. The slopes of this ridge are covered with endemic palms above which towers the Coco-de mer.

The coco-de-mer is less abundantly represented in this area.

Cocos de-mer (presumably survivors from the original forest) form the first storey at a height varying between 60 to 100 feet. The second storey is formed by Deckenia at a height of about 40 feet and a third storey is formed by smaller species of palms and seedlings of the larger palms.

Curieuse island (Crown Land) situated North of Praslin is about 2 miles long by one mile broad. Early navigators reported the island to be covered with coco-de-mer, but today the palms are scattered in relic patches and small groves, which in no way deserve the name of forest.

The coco-de-mer grows in a deep, red lateritic soil formed by the ultimate decomposition of granite. The palm does not grow like the coconut on sandy soil; it is definitely a hillside species which may also

develop at sea level on spurs on spurs of granitic soil which run down abruptly to the sea. The composition of this laterite is fairly constant and if there is any difference from place to place it is only due to the amount of organic matter present. Whenever there is a high amount of organic matter present the soil is brownish in colour and is less clayey and the palms it supports are healthier than on poorer soils.

IX *Uses of Coco-de-mer tree.*

The stem does not find any use as the wood is rather soft and is liable to rot easily. It is therefore useless as a source of timber.

The leaves provide a first class material for thatching purposes. They are so large that only a few are sufficient to cover a native hut completely.

The young leaves are used on a large scale for making the beautiful straw hats which are worn by a large fraction of the population. They enter also in the composition of the coco-de-mer mats and baskets which are turned out in large numbers by expert hands.

The fruit is eaten at an early stage during its development.

The nuts are exported and sold in the East, where the endosperm is reputed for its medicinal properties. Arabs and Indians use it as a tonic, an aphrodisiac, and a poison antidote.

It is a pity that attempts to use the endosperm as vegetable ivory failed on account of the ease with which it cracks. Professor Pieraets of Brussels tried his best to overcome this difficulty but unfortunately his attempts to produce a commercial product from the endosperm failed.

The shell of the nut is put to various uses : water bottles, fruit bowls, bowls for baling, plates etc., etc.

The plates and dishes of coco-de-mer shell are well known objects it the Praslin crockery. Bowls for baling form the equipment of every boat and " pirogue ".

The bowls produced when the lobes of the nut are cut parallel to the sinus are well known in Mauritius where shopkeepers use them for measuring out rice or sugar.

At one time the bowls were quite useful in Mauritius sugar factories where they were used to scoop out sugar from the centrifugals.

Pilgrims on their way to Mecca are supposed to eat their food from utensils produced by nature and there again the coco-de-mer bowls become of some use.

Acknowledgements.

The writer is greatly indebted to Dr. J. F. G. Wheeler for the line drawings of the staminate and pistillate palms and also for the drawing representing the palms in their natural environment in the Vallée de Mai, (plates II-IV) to Mr. G. de Comarmond for permission to reproduce the various photographs, to Mr. G. Savy for Maps I and II, and finally to Mr. France Jumeau for his help and for facilities granted to work in the Vallée de Mai.

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RAPPORT SUR L'INDUSTRIE DU THÉ DE L'ILE MAURICE*

par

LE CAPITAINE E. G. DE MOWBRAY, C.B.E., R.N.

2ème PARTIE

Nouveau Développement

L'industrie du Thé de l'île Maurice est restreinte à une culture d'environ 1,812 arpents et repose uniquement sur un marché local très lucratif qui est encore relativement peu exploité.

Dans un proche avenir, cependant, la production de toutes les plantations réunies dépassera la consommation locale actuelle et il deviendra nécessaire alors de réduire la production ou d'exporter le surplus. L'auteur est convaincu que la consommation locale pourrait être amenée à absorber ce surplus de production envisagé et même mieux, à augmenter la consommation du pays à tel point que de nouvelles étendues pourraient en outre être cultivées en thé.

Le climat se prête parfaitement bien à la culture du thé ainsi qu'il a été déjà dit. Même les régions moins humides, où l'on enregistre une soixantaine de pouces de pluie annuellement, pourraient avantageusement être cultivées en thé à condition toutefois que la pluviométrie soit assez uniforme ; au point de vue température, celle-ci est propice dans presque toutes les régions de l'île et la culture du thé peut aussi bien se faire dans les régions basses. La différence de qualité entre les thés produits dans ces différentes régions serait immatérielle. Les brises de mer qui balayent l'île maintient une atmosphère favorable à la bonne qualité des feuilles. Les vents cycloniques effeuillent généralement les plants de thé, mais ceux-ci se refont toujours assez rapidement. Les jeunes plants, par contre, souffrent énormement des cyclones qui visitent l'île. A part une perte temporaire d'une partie de la récolte, les plantations de thé résistent remarquablement bien aux cyclones. Depuis 1940, 14 cyclones ont été enregistrés à Maurice dont 5 furent très violents.

Il existe à Maurice plus de 50,000 arpents de terre susceptibles de produire du thé. Environ 10,000 appartiennent au Gouvernement, le reste aux propriétés privées. La topographie de ces terres ressemble beaucoup à celles des régions productrices de thé de l'Afrique. Elles sont relativement plates ou ondulenses à l'exception de quelques ravinements et de

*Report on the Tea Industry of Mauritius by Capt. E.G.B. de Mowbray, C.B.E., R.N, Dev. & Wel. Pub. No. 36 pp. 39., G.P. Port Louis, 1946.

collines escarpées. Il serait difficile en bien d'autres pays de trouver dans une même région une telle étendue où les conditions sont favorables à la culture du thé. En général ces sols sont déficitaires en potasse et en phosphates, éléments nutritifs qui peuvent être apportés sous forme d'engrais, leur fertilité, par contre, est révélée par la présence d'une brousse épaisse qui recouvre ces terres et la rapidité avec laquelle la brousse en reprend possession lorsqu'elles sont abandonnées. Le pH des sols de Maurice varie entre 4.5 et 6.0. C'est une condition du sol très propice aux théiers. Au cas où un développement de la culture du thé serait envisagé, le Service d'Agriculture devrait entreprendre des analyses plus détaillées de ces sols. Il est possible qu'il existe certaines déficiences en oligo-éléments ainsi qu'il a été découvert au Nyasaland dans certains sols qui manquaient de soufre et de cuivre en dépit des rapports favorables dont ils avaient été l'objet.

Une grande partie de ces terres est rocheuse. Mais cela ne présente aucune objection à la culture du thé. En outre les terres rocheuses sont moins susceptibles à l'érosion et se prêtent bien aux travaux de terrassement de même qu'elles fournissent les matériaux nécessaires à la construction des routes. L'auteur pense que les terres dans la région de la Rivière Dubois situées aux environs de Midlands sont les meilleures qu'il ait rencontrées à Maurice pour le thé et par contre celles de la région de la Mare-aux-Vacoas les plus mauvaises.

Tout plan d'expansion de l'industrie en vue de satisfaire à l'augmentation des besoins de la colonie sera en grande partie exécuté par des Mauriciens qui n'ont actuellement pas suffisamment d'expérience dans ce genre de travail. Il leur faudra donc un enseignement approprié. Si les recommandations faites au sujet de la nomination d'un "Tea Officer" et la création d'une station expérimentale sont approuvées, il sera facile d'organiser un système d'enseignement adéquat.

Le personnel requis pour un grand établissement moderne de thé d'environ 1,000 arpents comprend :

1 Administrateur	1 Asst. Préparateur de thé
1 Asst. Administrateur	1 Clerc
1 2e. Asst. Administrateur	1 Asst. Clerc
1 Chef d'Usine	1 Infirmier
1 Préparateur de thé	1 Maître d'Ecole.

Dans un pays comme Maurice où le relief du sol de la plupart des terrains est onduleux ou presque plat, il n'est pas nécessaire d'employer des terrains trop en pente. Les nouvelles terres ne devront donc être ouvertes que dans des terrains à relief modéré ou plats et les pentes abruptes laissées en forêts. Le coût de défrichement ne devrait pas être excessif malgré le prix élevé de la main-d'œuvre, ces terrains se prêtant favorablement à l'emploi de machine d'autant plus que la végétation actuelle qui s'y trouve est principalement composée de broussailles où de grands arbres ne se rencontrent qu'assez rarement.

A peu d'exception le type de thé que l'on peut obtenir localement n'est

pas satisfaisant. De nouvelles variétés de l'Inde et de Ceylan devraient être introduites au plus tôt et plantées dans des pépinières du Gouvernement et qui seules devront produire les semences pour toutes nouvelles plantations. Ces lignées devront être isolées en vue de la production de semences pures. L'introduction de semence à Maurice ne présente aucun danger d'introduction de maladies si elles proviennent de sources connues.

Les usines de construction légère telles qu'on en trouve à Maurice n'offrent pas suffisamment de garantie contre les cyclones. La construction en beton armée comme à Bois Chéri devrait être adoptée pour les nouvelles usines.

Les autres travaux de plantation, drainage, terrassement, etc. ne doivent pas nécessairement être onéreux.

Si un type hybride de thé est planté, l'espacement ne doit pas être plus de 3 1/2 pieds entre les lignes et de 3 ou 3 1/2 pieds entre les plants. Le type indien devra cependant être légèrement plus espacé soit 4 pieds entre les lignes et 4 pieds entre les plants. Dans les terrains plats, la plantation en quinconce permet de cultiver plus de plants par unité de surface que la méthode ordinairement employée. La plantation à niveau de contour est recommandée pour les terrains en pente. Les mesures contre l'érosion du sol ne doivent pas être négligées, les plantations de thé étant relativement lentes à se développer, laissant le sol exposé jusqu'à ce que les plants aient recouvert le sol.

L'expansion de l'industrie pour les besoins locaux ne serait pas grandement handicapée par le coût de la main-d'œuvre et de production en général. Si de grandes étendues de terre sont ouvertes en vue de produire aux fins d'exportation, la main-d'œuvre devra être abondante, effective et d'un prix raisonnable.

Un grand établissement de thé doit avoir une main-d'œuvre résidant sur les lieux. La plupart des laboureurs mauriciens employés sur les établissements sucriers ou de thé résident ailleurs et cherchent de l'emploi là où les besoins saisonniers prennent une rémunération plus forte. Il semblerait que les propriétaires éventuels de nouveaux établissements de thé devraient s'efforcer à procurer de bons logements et les amérités de l'existence à leurs employés. D'après l'expérience personnelle de l'auteur appuyée par celle d'autres producteurs de thé, ils verront que les travailleurs apprécient davantage les bonnes conditions d'existence que des gages se montant à des chiffres extravagants.

La consommation du thé à Maurice n'est actuellement que de 1.49 livres par tête. Au moyen d'une propagande bien conduite la consommation pourrait, en très peu de temps, être amenée à au moins 3 5 lbs. par tête. Ce chiffre équivaudrait à une consommation de 1,500 000 livres annuellement, soit 500,000 livres de plus que la production estimée de toutes les plantations existantes qui serait d'environ 980,000 lbs.

L'auteur suggère qu'aussitôt que le controle de l'industrie du thé sera établi, une campagne de propagande soit lancée et qu'en même temps

environ 600 arpents soient ouverts et cultivés en thé. Dans une dizaine d'années ces nouvelles plantations produiraient au taux de 800 lbs. à l'arpent suffisamment de thé pour satisfaire au besoin supplémentaire de 500,000 lbs.

Il existe 72 plantations de thé variant de 300 à moins d'un arpent chacune. Certaines devront être abandonnées et refaites ailleurs et d'autres entièrement rénovées. Il n'est pas recommandable que d'autres petites plantations soient nouvellement créés. Il serait préférable de permettre à l'entreprise privée locale d'entreprendre sous le contrôle et les directives du gouvernement la culture en bloc des 600 arpents mentionnés plus haut et qui pourraient constituer une propriété modèle.

Les salaires élevés, le rendement de travail médiocre et la mauvaise qualité de la main-d'œuvre du moment annulent pour le présent toutes les chances possibles d'un développement de l'industrie sur une plus grande échelle.

3me Partie

Recommandation pour l'organisation future de l'Industrie et la vente du produit.

La consommation de thé, compte non tenu de la Chine, est d'environ 900,000,000 lbs par an, et excède la production mondiale. Cette situation est due aux Indes Néerlandaises dont l'exportation a été arrêtée et qui se montait à près de 160,000,000 de livres de même qu'à l'augmentation rapide de la consommation du thé dans l'Inde et les autres pays producteurs. La consommation de l'Inde a été de 140,000,000 lbs. en 1945, soit un quart de sa production. Les perspectives de l'industrie du thé sont bonnes. Les Indiens et les autres races de couleur prennent goût au thé. En Amérique, l'augmentation de la consommation n'attend plus qu'une fourniture plus élevée.

La Chine qui consomme bien plus de thé que le reste du monde entier pourrait, de même que l'extension des cultures dans l'Inde et à Ceylan, déséquilibrer le marché dans un avenir quelconque. Mais tant qu'existera " l'International Tea Marketing Board " il y a peu de crainte d'une telle éventualité, du moins prochaine et l'industrie mondiale du thé doit à cette institution une très grande part de sa sécurité.

A Maurice il existe 869 arpents de thé en plein rapport et 943 arpents de jeunes plantations. Pendant l'année 1945-46 la production totale de thé a été de 511,500 lbs. soit une moyenne de 232 lbs à l'arpent. Ce chiffre aurait été plus élevé par 10 à 15 o/o s'il n'y avait pas eu trois violents cyclones pendant cette période. De 1895 à 1944 la consommation a passé de 88,000 lbs à 634,500 lbs soit 1.40 lbs par tête de la population.

Depuis 1940 les importations ont été réduites du fait de la guerre et en 1943 un quota était alloué réduisant les importations de 25% de ce

qu'elles étaient pendant la période précédant la guerre. En 1944 l'importation se chiffrait à 115.000 lbs. de thé. Le thé importé est soumis à une taxe douanière de 0.60 cs. par kilo de thé provenant de l'Empire et de 0.90 cs. par kilo pour les thés provenant de pays étrangers.

La production locale dans les années à venir est estimée comme suit :

Année	Propriété de Bois Chéri lbs.	Autres plantations lbs.	Total lbs.
1946—47	216,900	352,200	569,100
1947—48	261,600	363,900	625,500
1948—49	305,200	375,700	680,900
1949—50	357,300	399,100	756,400
1950—51	408,300	422,600	830,900
1951—52	459,400	446,100	905,500
1952—53	510,400	469,600	980,100

Ces chiffres ne sont naturellement qu'approximatifs et supposent que les cultures seront bien faites afin de rendre en moyenne 800 lbs à l'arpent à Bois Chéri et 400 lbs dans les autres plantations.

On voit d'après le tableau ci-dessus que la production en 1948 excèdera la consommation de l'année 1944 qui a été la plus forte observée jusqu'ici.

En assumant que les importations soient réduites pratiquement à néant, il faudra qu'en 1953 la consommation locale atteigne 1,000,000 lbs., soit 2 lbs par tête pour pouvoir absorber la production estimée de cette année sans aucune extension des cultures.

Afin d'éviter que la colonie n'arrive à une surproduction et si l'on envisage une extension de l'industrie, des mesures doivent être rapidement prises afin que l'industrie et le marché soient mis sous un contrôle gouvernemental qui devra être ferme mais suffisamment flexible.

Jusqu'ici l'industrie du thé n'a pas eu de directives éclairées. Un "Tea Board" existe mais seulement en qualité consultative. Il n'exerce aucun pouvoir exécutif. Au stade actuel, cette industrie réclame autant d'avis éclairés que de contrôle et si ces deux facteurs n'interviennent pas à temps, les espoirs pour l'avenir seront bien sombres.

La nécessité d'un "Tea Officer" est indiscutable et sa nomination ne devrait pas tarder. L'auteur est d'opinion que le choix d'un tel officier doit se porter sur un agriculteur de profession possédant suffisamment de personnalité et de compétence pour se trouver de pair avec les différentes personnalités avec lesquelles il sera en relation. Avant de

prendre ses fonctions le " Tea Officer " devra entreprendre un voyage d'études à Ceylan, au Nyasaland et au Kenya pour se familiariser avec les méthodes employées dans ces pays. Il serait ensuite très profitable à l'industrie qu'il aille visiter le centre commercial du thé à Londres pour connaître les rouages du marché et ses exigences. De plus cet officier devrait avoir toutes les facilités de faire périodiquement des voyages d'études de courte durée afin de se tenir au courant des progrès réalisés dans les grands pays producteurs.

Pour ce qui est du contrôle de l'industrie, l'auteur pense que le " Tea Board " actuel soit dissous et qu'un comité représentatif soit établi avec des pouvoirs exécutifs afin de diriger et de veiller aux intérêts de cette industrie. Ce comité pourrait être intitulé " The Executive Tea Committee of Mauritius " et devrait comprendre:

1 *Senior Agricultural Officer* du Service d'Agriculture
1 Officier du Bureau du Travail
1 Officier de la Trésorerie
} Représentant le Gouvernement.

1 Membre de la Chambre d'Agriculture
1 Gros planteur de thé
1 Petit planteur de thé
} Représentant l'Industrie Agricole.

les attributions de ce Comité seraient de :

(1) Veiller aux intérêts de l'industrie du thé et servir de liaison entre l'industrie et le Gouvernement.

(2) Consulter le Gouvernement sur les questions législatives ayant rapport avec l'industrie du thé.

(3) Organiser et contrôler le marché du thé à Maurice.

(4) Organiser et entreprendre une propagande ayant pour but d'amener à une augmentation de la consommation locale.

(5) Représenter l'industrie dans ses rapports avec l'*International Tea Committee.*

Il est indiscutable que l'industrie du thé à Maurice ne peut être mise sur une base commerciale saine aussi longtemps qu'une grande proportion du thé produit sera fabriquée dans de mauvaises conditions sanitaires comme dans les quatre usines primitives de Curepipe, Avenir St. André, Pont Coleville et Nouvelle France.

L'auteur recommande très fortement que ces quatre usines soient remplacées au plus tôt par une usine moderne, laquelle devra, pour des raisons données, être construite et dirigée par le Gouvernement et qu'une compensation soit accordée aux propriétaires des usines désaffectées.

La bonne fabrication du thé commence aux champs et se termine à l'usine, en fait, la bonne qualité des feuilles est en relation directe avec

l'état de la plante dont la vigueur dépend des soins accordés aux plantations et de l'état de la fertilité du sol.

Ceci est dit dans le but de souligner les mauvaises conditions agricoles qui règnent dans la plupart des plantations. Si l'on Maurice espère produire un thé de bonne qualité il faudra que les façons agricoles telles qu'elles se pratiquent sur ces plantations soient sérieusement envisagées. A ce point de vue l'auteur recommande la mise en œuvre d'une station expérimentale d'une certaine d'arpents qui servirait aux expériences culturales et aux démonstrations. La station expérimentale ainsi que l'usine Gouvernementale devrait se trouver ensemble sous la direction du " government Tea Officer ".

L'auteur recommande que les plantations appauvries par l'érosion et la mauvaise culture soient abandonnées et que de nouvelles plantations d'égale étendue soient faites sur de bonnes terres nouvellement ouvertes.

Au point de vue fabrication, les conditions existant à Bois Chéri sont idéales. Pourtant la préparation dans cet établissement pourrait se perfectionner davantage et les thés produits s'améliorer en conséquence. Si tous les thés produits à Maurice étaient fabriqués comme à Bois Chéri, leur qualité deviendrait bonne et courante.

L'auteur étudie ensuite différents aspects économiques de l'industrie du thé tels que le marché, le contrôle de l'importation et de l'exportation, l'emballage, la propagande et les relations de l'Industrie locale avec l'International Tea Committee.

L'auteur n'est pas d'avis que la fabrication du thé vert se fasse dans les mêmes usines fabriquant du thé noir, et condamne la pratique d'aromatiser le thé avec des essences dans les usines. Ces parfums imprègnent non seulement toute l'usine mais aussi contaminent les étagères des magasins.

A.E.C.

SOCIÉTÉ DES CHIMISTES ET DES TECHNICIENS DES INDUSTRIES AGRICOLES DE MAURICE

Preliminary Report on Industrial & Chemical Control.

The Committee of the Société des Chimistes, have for several years been concerned with the Standardisation of Industrial and Chemical Control in the Sugar factories of Mauritius. With this end in view the following Technical Committee was formed in 1945 to study the question :

Chairman : R. d'Avice
Secretary : S. Staub

Members : L. Baisrac, O. d'Hotman, S. Dupont, A. Hardy, V. Olivier

Co-opted Members : G. Park, A. Wiehe

It was decided to adopt the following schedule :

1o. Preparation of a new laboratory register.

2o. Preparation of a laboratory handbook including :

(a) An English-French lexicon of terms used in Chemical and Industrial Control.
(b) A definition of terms.
(c) Methods of weighing and measuring.
(d) Methods of sampling.
(e) A description of the apparatus to be used for analyses.
(f) Methods of analysis.
(g) Methods of Calculations.
(h) Tables.

As regards the new laboratory register the work has now been completed and the Committee of the ' Société des Chimistes ' has recommended its adoption by all the sugar factories. This new register necessitates some changes in the Industrial and Chemical Control ; the changes have been made with a view to obtaining the maximum useful information for a given amount of work.

If now, as we hope, all the sugar factories adopt this new record book the uniformity in showing all the control figures will be of great help to the technicians of the Industry in the same way as the uniformity in keeping accounts of factories help considerably the financiers of this industry.

As regards the laboratory handbook good progress has been made and the Committee hopes that it will not be long before it is ready for distribution to Sugar Factories.

The Committee should like now to come upon a point which has been stressed right from the time of the formation of the Committee and in connection with which the Chamber of Agriculture have promised their help. It concerns the equipment of factories in respect of the sampling and the weighing of produces.

The fundamental data for accurate determination of sucrose content of cane and of losses of sugar in the factory are accurate weights of cane, juice and imbibition water, the latter figure being required for obtaining weight of bagasse. In Mauritius there are only six machines for weighing juice out of which five are cane weighing machines modified for the task and which depend on the human factor for reliability. Measuring tanks are used in all other cases and are not satisfactory due mainly to the presence of froth and occluded air. Water when used cold may be measured ; hot water should be weighed. In only a few factories imbibition water is measured. The weight of bagasse is usually calculated by an arbitrarily fixed factor.

The following figures worked out from factory figures published for the 1945 crop show that our figures are not wholly reliable :

SEASON 1945

Factor to pass from Brix of 1st Expressed Juice to Brix of Absolute Juice	Difference between Brix of Absolute Juice and undiluted juice remaining in Bagasse	Factor to pass from Brix of 1st Expressed Juice to Brix of Absolute Juice	Difference Between Brix of Absolute Juice and undiluted juice remaining in Bagasse
0.979	+ 6.69	0.938	— 1.60
0.961	+ 10.90	0.936	+ 2.20
0.959	— 1.71	0.935	+ 2.69
0.957	+ 1.12	0.935	+ 0.53
0.952	— 0.12	0.935	+ 1.16
0.950	+ 0.63	0.934	+ 0.51
0.950	+ 0.46	0.932	— 2.47
0.946	+ 0.38	0.932	+ 0.40
0.946	+ 0.68	0.930	+ 0.39
0.943	— 0.15	0.930	+ 0.22
0.941	— 0.85	0.922	+ 0.82
0.941	+ 0.31	0.920	+ 0.56
0.939	+ 0.22	0.920	+ 2.34
0.939	+ 0.10	0.915	— 0.31
0.938	— 0.08		
0.938	— 0.01		
Average of all factories :	0.952		+ 2.26

There should be a close relation between Brix of First Expressed Juice and Brix of Absolute Juice, but this is not the case in our factories. Also the difference between Brix Absolute Juice and Brix of undiluted Juice remaining in Bagasse is a fairly constant figure, here that difference varies considerably and the Brix of Absolute Juice is even sometimes less than that of the Brix of undiluted Juice remaining in Bagasse.

The following figures are also conclusive :

Sucrose in juice o/o cane	12.62	
Sucrose extracted		10.97
Sucrose lost in scums o/o cane		0.14
Sucrose lost in molasses o/o cane		1.42
Undetermined losses o/o cane		0.09
		12.62

Under conditions obtaining during the 1945 crop such a figure for undetermined losses is not possible even if our factories were equiped with the best machinery and plant.

In South Africa sugar factories have to be equiped with the following :

(a) weighing scales for juice and scales or meters for water of a type approved by Government.

(b) automatic devices which record the filling and emptying of each scale tank.

(c) all juice and water scales are provided with automatic counters recording the number of tanks weighed.

(d) sequence-numbered tickets are used in connection with all cane weighbridges, juice and water scales.

There is a full Government service for testing the accuracy of all the apparatus.

In Mauritius only cane weighing machines are tested and accuracy of weighing checked by officers of the Central Board.

There is another point to consider, that of automatic sampling. It is generally admitted that sampling in our factories, entrusted to laboratory boys, is not very satisfactory and automatic devices should be used whenever possible.

The installation of weighing scales for juice, measuring apparatus for water and automatic sampling devices in all our sugar factories would be highly beneficial to the sugar Industry. Only accurate control may show where improvements are to be expected. The Committee is of opinion that the best and quickest way of obtaining such a result would be :

(1) That a technician should proceed to South Africa during the present crop to inquire into the best machines (consideration being given to cost) to be used under (a), (b) and (c) above, the testing

of the weighing and measuring apparatus and the automatic sampling devices used.

(2) When the report is available and an approximation of the cost involved is obtained, that Government should be approached with a view to granting a loan to factories for purchasing the necessary apparatus. The loan to be paid back in say five equaly yearly instalments.

(3) The Central Board should be requested in due course to carry out the testing of the weighing and measuring apparatus.

(4) In view of (3) the Committee recommends that the technician who should study the question should be a technician of the Central Board.

SEMENCES DE LÉGUMES

Le public peut obtenir des semences de certains légumes — laitues, bringelles, raves, choux-fleurs, brède de Chine, brède Martin, petit pois, haricots, tomates, piments salade — à la Station d'Essais de Barkly à Beau-Bassin, en s'adressant soit personnellement soit par lettre à l'Officier en Charge. Les sachets se vendent à 30 sous l'un et l'on peut faire les commandes par la poste s'il ne s'agit que de petites quantités, sauf dans le cas des petits pois et haricots. On peut obtenir cinq variétés de laitue, mignonette, blonde d'été, Sucrine, " Webb's wonderful ", " Iceberg "; deux variétés de petits pois : " green feast " et " black eyed Suzan "; trois variétés de haricots, " Long Tom ", " Victory " et " Golden Queen "; des bringelles " Rosita " et " Garcia " et des piments salade " Neapolitan " et " Chinese giant ".

SUGAR INDUSTRY RETIRING FUND

ANNÉE 1946

Rapport du Président, l'Honorable Me André Raffray, K.C., lu à l'Assemblée générale annuelle du Fonds, tenue le 26 Mars 1496, à la Chambre d'Agriculture.

MESSIEURS,

Je suis heureux de vous souhaiter la bienvenue à cette première réunion générale annuelle du Sugar Industry Retiring Fund.

La création de ce Fonds date du 1er Janvier 1946.

Vous serez invités dans quelques instants à examiner l'état de situation arrêté au 31 décembre 1946 et à vous prononcer sur cette première année d'administration.

Nous osons espérer que vous serez satisfaits des résultats déjà obtenus.

Si la réalisation d'un Fonds de retraite pour les Employés de propriétés sucrières est restée longtemps dans le domaine des chimères, si la création du Sugar Industry Retiring Fund, l'an dernier, après de longues années d'étude et de tâtonnemen , n'a pas rencontré l'enthousiasme de tous les intéressés, principalement en raison de la modicité du taux des pensions, il n'en est pas moins vrai qu'un pas décisif a été fait dans la direction d'une organisation destinée à assurer la sécurité, dans leurs vieux jours, de ces fidèles employés de nos propriétés sucrières qui consacrent leur énergie et leur dévouement, toute une vie durant, à la bonne marche de ces propriétés.

Il est réconfortant de penser que cet acte de justice a été enfin accompli et je suis sûr d'interpreter vos sentiments en exprimant notre gratitude à tous ceux qui ont contribué à l'organisation et à la mise en marche de ce Fonds de retraite.

S'il est vrai, Messieurs, que les débuts ont été et sont encore modestes, je me garderai de faire miroiter à vos yeux des perspectives alléchantes mais trompeuses d'avantages immédiats et considérables ; je crois d'autre part que cette première année d'administration, d'expérience je pourrais dire, a prouvé dès maintenant la stabilité du Fonds et nous a fourni des données et des chiffres qui nous permettent d'espérer que les avantages offerts aux associés de ce Fonds ne pourront aller qu'en s'améliorant.

Je ne vous donnerai pas de chiffres plus ou moins problématiques, je ne me lancerai pas dans des prévisions plus ou moins hasardeuses, mais je vous inviterai simplement à jeter un coup d'œil sur l'état de situation qui vous est soumis aujourd'hui afin que vous puissiez vous-mêmes vous assurer que le Fonds est en bonne voie.

Avant de vous en parler en détail je voudrais cependant vous donner

quelques indications d'un ordre général sur les activités du Comité de Direction et sur la constitution du Fonds.

Le premier Comité de Direction, choisi, comme prévu par la loi, par la Chambre d'Agriculture, pour la première année, se composait des membres suivants :

(a) Représentants des Employeurs : l'Hon. Raymond Hein, M. Philippe Espitalier Noël et moi-même.

(b) Représentants des Employés : MM. André Martin, André de Comarmond et Claude Noël ; ce dernier ayant démissionné fut remplacé par M. Francis N. Coombes.

(c) Septième membre, choisi pour trois ans par les six membres sus-nommés : M. Antoine Harel.

Ce Comité s'est réuni 21 fois dans le cours de l'année dernière et a été responsable du départ du Fonds.

Il a choisi comme Secrétaire M. Arthur Martial et comme Comptable M. Paul de Comarmond.

Ces deux employés du Fonds ont eu un travail considérable à faire pour cette première année d'organisation et de mise en marche, et je tiens à rendre hommage à la compétence, à la conscience et au zèle qu'ils ont apportés dans l'accomplissement de leur tâche.

Nous avons réussi, après de nombreuses difficultés, à trouver un local à la rue Sir W. Newton, où s'est établi le siège social du Fonds et s'est ouvert notre bureau.

Ce local est fort modeste, et quoique nous ne puissions trop nous plaindre par ces temps de crise de logement, nous devons espérer qu'un jour viendra où le siège social du Sugar Industry Retiring Fund sera plus en rapport avec l'importance et le *standing* de ce Fonds.

Nombreux sont les associés du Fonds qui ont visité nos bureaux dans le courant de l'année dernière pour obtenir des renseignements et des conseils. Ils seront toujours les bienvenus et c'est la politique du Comité de Direction d'encourager et de développer la plus grande coopération entre le comité et le personnel du bureau d'une part et tous les employés de propriétés, membres du Fonds, d'autre part.

Le mobilier du bureau a été constitué au fur et à mesure et est pratiquement complet.

Le 20 Décembre 1946, deux réunions générales des Employeurs et des Employés respectivement furent convoquées pour l'élection du comité pour 1947. Ces réunions se tinrent à la Chambre d'Agriculture.

Les membres suivants furent élus :

(a) Représentants des Employeurs : Hon. Rd. Hein, Philippe E. Noël, Hon. A. Raffray.

(b) Représentants des Employés : M.M. Francis North Coombes, Guy Sauzier et C. G. Gibson.

M. Antoine Harel reste, conformément à la loi, membre du comité, pour cette seconde année.

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Et voici maintenant quelques détails sur la constitution du Fonds :

(a) Le nombre des Employeurs contribuant au Fonds s'élevait au 31 Décembre 1946 à 97, se répartissant comme suit :

3 Institutions (Syndicat, Chambre d'Agriculture, S. I. R. F.)
8 Courtiers
3 Distilleries
33 Propriétés à usine
50 Propriétés sans usine, petites et moyennes

(b) Le nombre des Employés contribuant au Fonds à la même date s'élevait à 1283.

(c) Le nombre d'Employés qui ont cessé de faire partie du Fonds au cours de 1946, s'est élevé à 97, s'analysant comme suit :

(d) 7 morts
(b) 88 ayant quitté l'Industrie Sucrière
(c) 2 retraits pour cause de santé.

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Passons maintenant, si vous le voulez bien, à l'examen de l'état de situation qui vous est soumis et qui est arrêté au 31 Décembre 1946.

Je n'entrerai pas dans tous ses détails, mais vous en indiquerai simplement les points les plus saillants.

Vous verrez tout d'abord au bilan que le total des contributions diverses (Employeurs et Employés) s'est élevé à Rs. 232.450.28.

D'autre part, la contribution spéciale des Employeurs se montant à Rs. 100.000 pour la première année et destinée au " Contingency Fund " a été intégralement payée.

L'institution de cette contribution spéciale a été, dès le début, acceptée et recommandée par les Employeurs et incorporée dans la loi.

Ce paiement intégral de Rs. 100.000 est venu renforcer le Fonds dès son départ, et les Employeurs ont certainement droit à la gratitude de leurs Employés pour l'immédiat appui qu'ils ont donné au Fonds par cette contribution spéciale.

Cette somme de Rs. 100.000 s'est trouvée augmentée d'un petit apport de Rs. 187.18 c. qui représente diverses petites sommes qui ont fait retour au Fonds en vertu de la loi dans le cas des contribuants qui se sont retirés du service de leur propre gré.

D'autre part, le " Contingency Fund " se montant à un total de Rs. 100,187.18 c., a supporté l'excédent des dépenses sur les revenus pour l'année écoulée, excédent qui a atteint, d'après le compte de Revenus et de Dépenses le chiffre net de Rs. 10.419.12 c., ce qui a laissé au compte du Contingency Fund une balance de Rs. 89.768.06 c.

Le total de nos entrées pour 1946 a donc été de Rs. 322.218.34 c.

La question du placement des fonds disponibles s'est posée au Comité. Comme vous le savez, l'Art. 20 de l'Ord. 59 de 1945 limite ce placement aux valeurs d'Etat du Gouvernement de Maurice de préférence, ou du London Stock Exchange.

Vous verrez qu'une somme de Rs. 205.500 avait été, au 31 Déc. 1946, investie dans des obligations du Mauritius War Loan, achetées au pair et donnant 3o/o d'intérêts. Je crois que c'est là un placement très intéressant et de tout repos.

A ce sujet, je désire exprimer tous nos remerciements à notre collègue du Comité de Direction, M Philippe Espitalier Noël, qui s'est bienveillamment chargé de nous procurer ces obligations, sans nous réclamer de commission.

Vous verrez également que nous avions en Banque, à la même date du 31.12.46, une somme disponible de Rs. 69,945.48 cs.

Nous pensons — et l'opinion qualifiée de notre collègue M. Gibson nous a été très utile en l'occurence — qu'à ce stade initial et en nous basant sur les modiques retraits effectués et les faibles sommes payées l'année dernière, nous pouvons sans danger continuer de placer la plus grande partie de nos disponibilités, gardant en réserve une somme maxima de Rs. 5000 pour faire face à toute obligation éventuelle envers les Employés qui prendraient leur retraite ou se retireraient de l'Industrie sucrière.

Nous continuerons donc, jusqu'à nouvel ordre, notre politique de placement de la plus grande partie de nos fonds au mieux de vos intérêts.

A ce propos, nous avons cru bon de prier notre collègue, M. Gibson, de bien vouloir approcher M. L. Mayhew, Comptable de l'Anglo-Ceylon et actuaire qualifié, pour lui demander s'il accepterait d'étudier l'organisation et le travail de notre Fonds, à la lumière des résultats obtenus l'année dernière, afin de nous guider, de nous conseiller et de nous suggérer toute modification et toute amélioration qui pourraient profiter aux associés du Fonds. Nous serions extrêmement reconnaissants à M. Mayhew s'il voulait bien accepter de s'intéresser à la question et de nous faire profiter de ses connaissances.

Pour en revenir à l'état de situation, il me reste deux points à vous signaler :

1o. Vous verrez qu'une somme de Rs. 42.766.88 représente les contributions dues au 31.12.46. Je dois vous expliquer que les contributions des Employeurs et des Employés sont généralement payées trimestriellement. Cette somme de Rs. 42.766.88 représente donc des sommes dues pour le dernier trimestre de 1946 et ont en fait été encaissées à ce jour.

2o. Je tiens à vous faire ressortir que nos frais généraux dont vous trouverez le détail au compte de Revenus et de Dépenses, ont dû, pour la première année, être payés en grande partie par le Contingency Fund. Comme contre-partie, les intérêts et escomptes se montant à Rs. 2,883.06c ont été

relativement faibles en raison du fait que nos placements se sont faits au fur et à mesure des paiements de contributions.

L'excédent des dépenses sur les revenus se montant à Rs. 10.419.12 représente donc un maximum à ce stade initial.

Cette année-ci l'équilibre devrait se faire et nous espérons que dans les années à venir le Fonds grossissant, les intérêts réalisés chaque année dépasseront de plus en plus nos frais généraux et pourront être distribués parmi tous les associés après un certain pourcentage qui doit aller à la réserve comme il est prévu par la loi.

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Messieurs, ce bref exposé aura servi, je l'espère, à vous donner les éclaircissements désirés sur l'état de nos finances et sur l'administration du Fonds.

J'aime à penser que vous y donnerez votre approbation.

Comme je vous le disais tout à l'heure, il est prématuré à cette heure de risquer des pronostics, mais je crois que, sans excès d'optimisme, on peut penser que le Sugar Industry Retiring Fund est maintenant fondé sur une bonne base et que l'avenir verra le développement et le succès de cette intéressante entreprise.

A ce sujet, je voudrais vous faire savoir qu'un sous-comité du Comité de Direction a été formé, se composant de mon ami, l'Hon. R. Hein, de notre Secrétaire, et de moi-même, pour étudier toutes modifications qu'il serait bon d'apporter à l'Ordonnance régissant notre Fonds afin d'en améliorer certains détails dans l'intérêt de tous ceux qui y contribuent. Ce sous-comité s'est mis à l'œuvre et nous espérons, dans un avenir pas trop éloigné, vous convoquer de nouveau afin de vous soumettre nos suggestions et de vous demander ce que vous en pensez. Nous espérons contribuer ainsi à une évolution heureuse du S. I. R. F.

Avant de terminer, je voudrais, Messieurs, en votre nom et au mien, exprimer tous nos remerciements à la Chambre d'Agriculture pour avoir aimablement mis ses salles à notre disposition pour notre réunion de ce jour.

Je voudrais également remercier le Mauritius Sugar Syndicate qui nous a grandement aidés en nous faisant des avances de fonds au début de notre administration l'année dernière et en recueillant les contributions de certains Employeurs.

Messieurs, je vous remercie de votre aimable attention et je vous invite maintenant à vous prononcer sur l'état de situation qui vous est présenté.

STATISTIQUES

1°. CLIMATOLOGIE

(a) Pluviométrie (Pouces)

Localités / Mois	Nord							Centre					
	Grand' Baie	Pamplemousses†	Pamplemousses (Normale)	Abercrombie	Abercrombie (Normale)	Ruisseau Rose	Belle Vue Maurel	Beau Bois (Moka)	Helvétia	Réduit	Réduit (Normale)	Curepipe*	Curepipe (Normale)
Jan. 1947	—	5.17	9.56	5.70	8.88	7.50	—	11.95	11.04	7.58	10.32	11.37	16.33
Fév. „	—	5.93	8.74	5.45	7.17	10.75	—	8.44	9.69	7.83	10.95	17.00	17.28

Localités / Mois	Est				Ouest					Sud			
	Centre de Flacq	Camp de Masque	Palmar	G.R.S.E.	Port-Louis	Case Noyale	Beau-Bassin	Beau-Bassin (Normale)	Richelieu	Rose Belle	Riche-en-Eau	Camp Diable	Chemin Grenier
Jan. 1947	6.41	9.11	4.21	2.24	8.91	0.85	5.35	6.71	4.64	9.51	—	9.34	13.40
Fév. „	5.12	7.35	2.78	3.31	9.40	1.03	6.26	7.27	4.25	8.03	—	6.18	5.13

(b) Température °C

Localités	Beau-Bassin		Réduit				Curepipe*		Richelieu	
Mois	Max.	Min.	Max.	Min.	Moy.	Nor.	Max.	Min.	Max.	Min.
Jan. 1947	29.6	22.4	27.5	22.5	24.8	24.1	26.2	20.9	29.7	23.6
Fév. „	29.9	22.1	26.9	21.9	24.1	24.3	25.0	20.6	30.0	23.7

(c) Insolation

Réduit		
Mois	Heures de Soleil	Fraction d'insolation
Jan. 1947.	207.0	51.0
Fév. „	245.9	69.0

*Collège Royal. † Jardin Botanique.

2o. Final Compilation of the 1946 Sugar Crop.

(Unit : One thousand metric tons)

Districts	1946	1945	1944	1943	1942	1941
Pamplemousses and Riv. du Rempart ...	86.70	41.71	57.60	77.64	73.60	81.19
Flacq	41.29	21.05	29.98	45.74	51.53	50.58
Moka	31.15	15.47	23.97	40.29	40.42	37.90
Plaines Wilhems ...	23.08	10.18	14.85	23.42	23.92	25.09
Black River	11.12	6.61	8.47	13.49	15.07	17.42
Savanne	47.39	22.04	33.95	55.71	61.36	54.40
Grand Port	50.33	21.99	30.82	54.43	64.98	57.10
Total	291.06	139.05	199.64	310.72	330.88	323.68

The total cane ground was 2,530,324 metric tons, and the average extraction of sugar per cent of cane worked out to 11.5.

The grades of sugar produced were the following :—

Raws ...	251,718	metric tons or	86.48 o/o of total
Vesous ...	39,223	,,	13.47 o/o ,,
Lows ...	120	,,	0.05 o/o ,,
	291,061		100.00 o/o

12th March, 1947

A. DE SORNAY,
Statistician.
Dept. of Agric. Mauritius.